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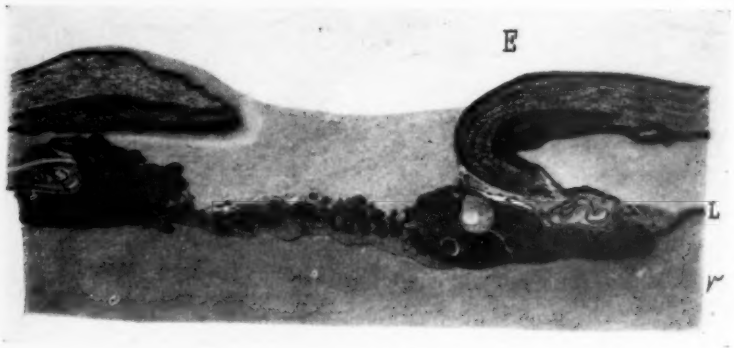

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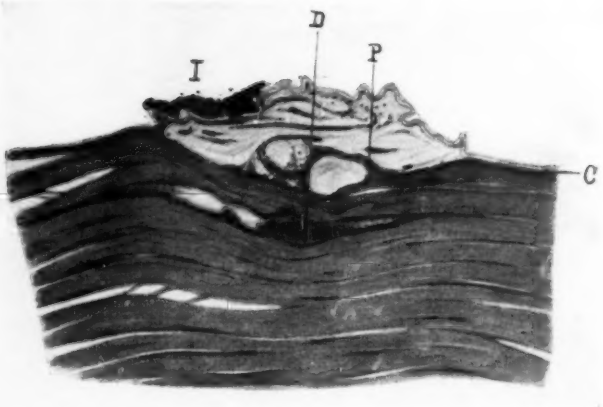

FIGURE 6

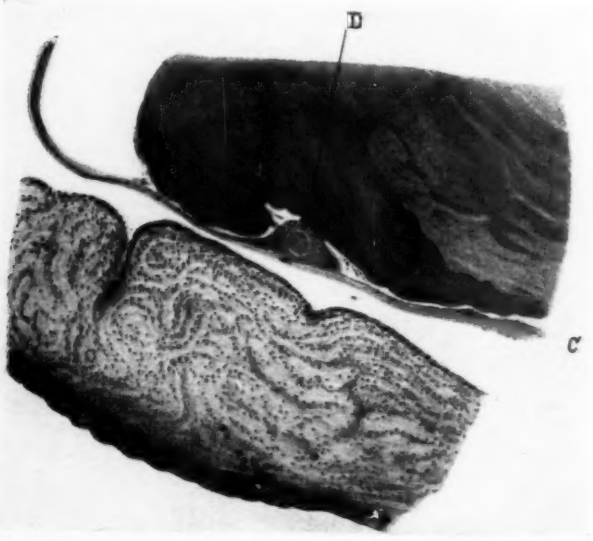

FIGURE 25

AMERICAN JOURNAL OF OPHTHALMOLOGY

VOLUME 30 JANUARY, 1947 NUMBER 1

PROLIFERATION OF THE EPITHELIUM OF THE LENS*

BERNARD SAMUELS, M.D.
New York

In the early days of the present century, it was decided that ectoderm and mesoderm are different and independent tissues and that the one cannot produce the other. This decision was arrived at largely from experiments made on the cornea. The cornea was employed, first, because it has relatively few cells of its own and, second, because the corneal corpuscles are characteristic and can be readily differentiated from cells that invade the cornea as a result of infection or trauma. The lens was not used in the early experiments because of its inaccessibility within the globe and the impossibility of reaching it without damaging nearby structures. If it had been available, it would have been evident at that time that a strict differentiation between ectoderm and mesoderm cannot always be made. It is possible for the epithelial cells of the lens, when irritated, to lay down a tissue, the anterior-subcapsular cataract, that has more of the physical qualities of mesoderm than of ectoderm. In later experiments as an object of embryologic investigation, the lens proved to be valuable in revealing the influence of the presence of one organ on the development of another, notably the effect of the retina on the development of the lens. In the cultivation of living tissue the epithelium of the lens has been employed with informative results.

Since the discovery that the lens is the site of cataract and that by its removal blindness can be cured, interest in the anatomy, pathology, physiology, and chemistry of the lens has never ceased. The radical operation of intracapsular extraction has once more directed attention to the physiology of the lens, since after this procedure complications may arise that seem to be caused by the removal of every vestige of this organ. The iris loses its support and may become tremulous. The vitreous may prolapse into the anterior chamber, and the retina may be lacerated and detached by the tremulous vitreous. The pupil may be drawn up as a consequence of complete

* Read before the Oxford Ophthalmological Congress at Oxford, England, July 5, 1946.

SDB

Fig. 2 (Samuels). Vesicular cells lying on the posterior capsule freely exposed to the aqueous.

Fig. 6 (Samuels). Anterior subcapsular cataract showing the changing of epithelial cells into fibers and the laying down of intercellular substance. I points to the iris, D to cellular debris, and P to the start of a basal layer.

Fig. 25 (Samuels). A large druselike body at D under the anterior capsule, C. Note the calcified lens which is dislocated and turned around in the anterior chamber.

aphakia. In the extracapsular operation, the preservation of the equatorial zone of the lens has the advantage of providing a cushion known for generations as Soemmerring's crystalline swelling, on which the ciliary zone of the iris may rest. It would seem, therefore, that the lens has functions other than those having to do solely with vision.

Soemmerring's crystalline swelling

Much information concerning the proliferative powers of the lenticular epithelium has been gained from examinations of the lens after the capsule has been opened, and a number of practical problems have been solved. It is known that Soemmerring's crystalline swelling consists of more than left-over lens matter. Within the sealed ring, there takes place a proliferation of the germinal cells, and the younger the lens the more active the process and the more distended and larger the ring (fig. 1). In doing a discission, it is often surprising, if the ring is opened, how great an amount of lens matter escapes. To guard against a secondary membrane in cases of extracapsular extraction, a large piece of the anterior capsule is excised so that no subcapsular cells are left to multiply and change into opaque fibers or to form so-called pearls of Elschnig (fig. 2, color plate). Unfortunately, after a cataract operation, if the eye remains irritable for a long period, exudative cells from the uvea may be deposited on the posterior capsule of the lens or on the anterior limiting layer of the vitreous. The singular phenomenon is that these cells also produce a connective-tissuelike membrane without there being the least sign that any element from the walls of a blood vessel took part in the process.

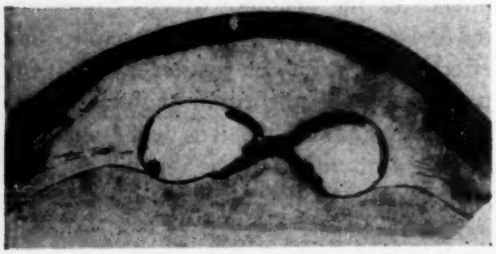

Fig. 1 (Samuels). Soemmerring's crystalline swelling. The nucleus of the lens is replaced by a broad band of dense avascular tissue in the formation of which only lenticular and exudative cells could have taken part.

Material

The present paper has for its chief purpose the summarizing of the proliferation of the epithelial cells of the lens in 185 cases of nontraumatic cataract. The cases were arranged in the following manner according to what was believed to have been the main factor in the production of the cataract:

	Cases
1. Ulcers of the cornea	18
2. Corneal scars	35
3. Spontaneous iritis	20
4. Spontaneous detachment of the retina	23
5. Intraocular tumors	58
6. Glaucoma	31

The six groups have been the subject of as many publications.[1-6] Scattered through these articles will be found much that is mentioned here, as well as many of the illustrations. Cataracts with a ruptured capsule were excluded from this long and varied list because the moment a capsule is opened, cells may enter from the uvea, as mentioned, and produce a tissue of their own, rendering the picture no longer one of pure epithelial proliferation.

Impermeability of the lens capsule

Since this paper concerns exclusively the proliferation of the lenticular epithelium, the question arises as to whether or not the lens capsule is pervious to cells from without. It is certain that, in very severe inflammation, pus cells may pass

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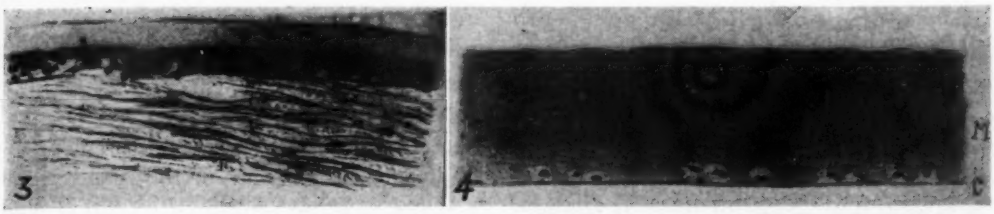


Figs. 3 and 4 (Samuels). Fig. 3, Pus cells near the anterior pole of the lens, lying between the subcapsular epithelium and the normal cortical substance. Apparently the capsule was intact. Fig. 4, Phagocytelike cells scattered along the posterior capsule. No hole was found in the capsule.

through the other two glass membranes; namely, Descemet's membrane and the lamina vitrea of the choroid. Leukocytes seem to be able to penetrate Descemet's membrane from either the corneal or the chamber side. The lamina vitrea of the choroid seems to be less permeable than Descemet's membrane. It is a common picture in panophthalmitis to see a focus of pus cells in the choroid congregated against the lamina vitrea detaching the pigment epithelium by fluid but not by pus cells.

There were two cases in which the origin of the cells was doubtful:

Case 1. Leukocytes beneath the capsule. The anterior chamber was filled with pus. A row of leukocytes had insinuated itself between the partially necrotic epithelium and the normal cortical substance (fig. 3). The capsule showed no sign of collapse as it would have done had it been perforated, allowing the escape of lens matter. In the absence of serial sections, the possibility of a hole in the capsule could not be excluded. My belief in the impermeability of the lens capsule to cellular elements remains unchanged.

Case 2. Phagocytes beneath the capsule. A retinoblastoma had filled an infant's eye, causing buphthalmos. The lens substance was liquefied. The remarkable feature was the presence of large, round hydropic cells straggling along the inner surface of the posterior capsule (fig. 4). Each cell had a small oblong nucleus and a foamlike protoplasm that gave it the appearance of a phagocyte that had taken up lipoid material which is certainly not lacking in the cataractous lens. There was a possibility that these were mononuclear cells which had traversed the capsule. On the other hand, they might have been cells of the capsular epithelium which had migrated posteriorly and changed in the liquefied medium.

In this connection, the lens in one of the cases of malignant melanoma showed how greatly the subcapsular cells may alter. A small, anterior-subcapsular cataract had formed and, nearby, some of the

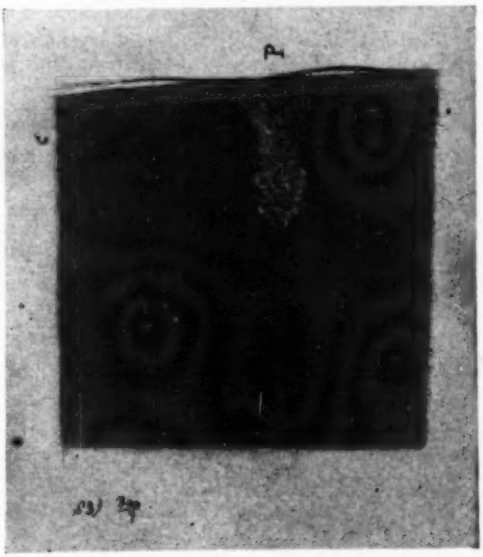


Fig. 5 (Samuels). Transformation of the low-cuboidal subcapsular epithelium into large, round hydropic cells, arranged in the form of a bunch of grapes suspended in the fluid cortical substance.

cells had desquamated. At another spot in the pupillary area, the cells had proliferated and arranged themselves in the form of a bunch of grapes which was suspended from the capsule into the fluid cortex (fig. 5). There was no doubt that they were derivatives of the lens epithelium. They were large, round, and hydropic, and their nuclei resembled the nuclei of the cells described above. The principal difference was that these cells had not taken up extraneous matter.

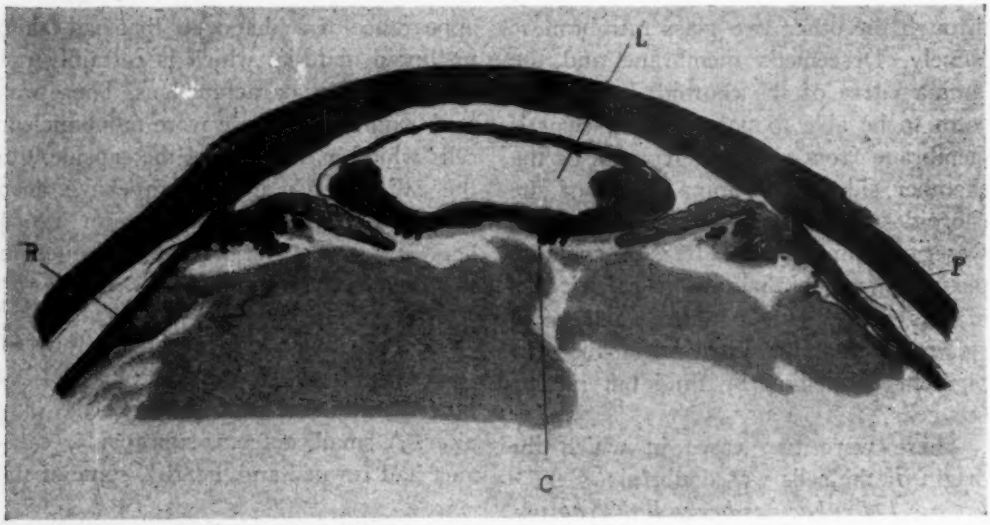


Fig. 7 (Samuels). L points to the lens and C to one of the anterior-subcapsular cataracts. The lens is dislocated into the anterior chamber and is turned around.

Proliferation of the lenticular epithelium

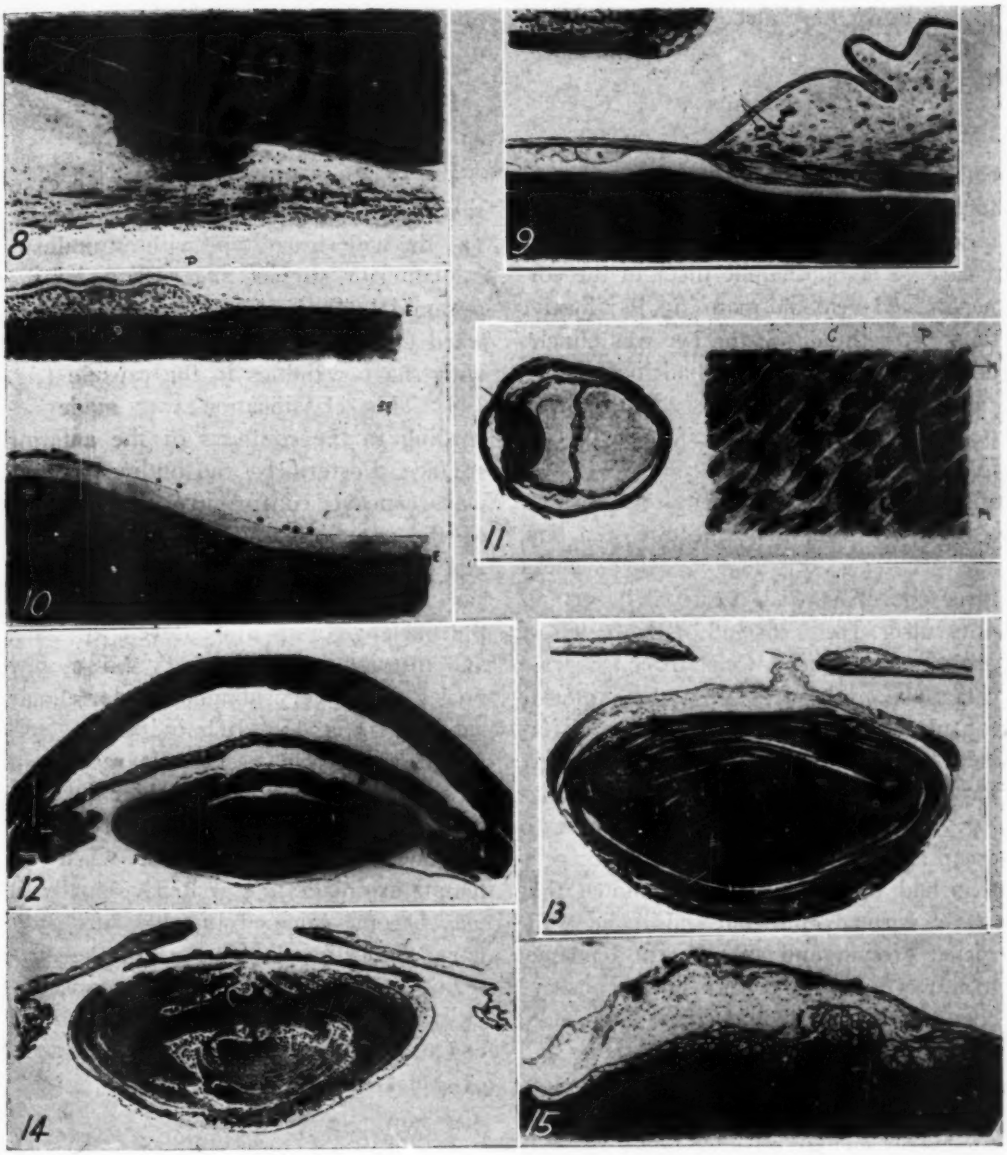
The proliferation was classified as follows: A. proliferation of the anterior-capsular cells; B. proliferation of the germinal cells; and, C. unusual findings.

A. Proliferation of the anterior-capsular epithelium (subcapsular cataract)

1. Localization of Subcapsular Cataract

a. Central Cataracts. The center of the pupil was found to be the most common site for the multiplication of the subcapsular cells and here they attained their highest degree of growth (fig. 6, color plate). Probably these cells have a special inclination to proliferate and, certainly in inflammation of the cornea, they are more exposed to direct irritation than the cells under the iris.

b. Excentric Cataract. The cataract was not invariably composed of one focus of proliferation. For example, in one lens there were two separate cataracts at a distance from the center (fig. 7). Cataracts at the equator were encountered usually as an extension of an anterior cataract. In a case of blindness from metastatic ophthalmia in a boy, aged six years, a cataract grew on the posterior capsule. In the recessus hyaloideo-capsularis there was a large focus of inflammatory cells. Epithelial cells coated the posterior capsule. Adjacent to the focus of cells in the recessus, the epithelial cells laid down a fibrous membrane—a true posterior-subcapsular cataract of ectodermal origin (fig. 8). The transplanted cells had not lost their power



Figs. 8 to 15 (Samuels). Fig. 8. At P there is a mass of exudative cells showing a giant cell to the left. The overlying epithelial cells reacted to the irritation by laying down a connective-tissuelike membrane. Fig. 9. An anterior polar cataract showing the basal layer of flat epithelial cells beneath which are vesicular cells. Fig. 10. In the upper drawing a row of very thin and elongated epithelial cells (E) hug the capsule apparently on their way to the cataract. The lower drawing shows how nuclear a subcapsular cataract is at first. Fig. 11. A cataract caused by sympathetic ophthalmia. The small drawing shows the iris converted into a tumorlike mass and replaced by lymphocytes, plasma cells, and giant cells. In the detail, C points to the capsule, P to the rapidly proliferating cataract, and M to mitotic figures. Fig. 12. The thick and extensive type of anterior subcapsular cataract. Fig. 13. The pyramidal type of anterior subcapsular cataract. Fig. 14. The thin type of anterior subcapsular cataract with a greatly wrinkled capsule. Fig. 15. A very old homogenous anterior subcapsular cataract outlined posteriorly by a row of basal cells beneath which are vesicular cells.

to lay down a connective-tissuelike substance.

2. Rapid Proliferation

Case 1. The most rapidly grown cataracts were seen in cases of corneal ulcers, especially those with a posterior abscess about to rupture. Thus it was in a case of lagophthalmic ulcer in the cornea of a 21-year-old man (fig. 9). Twelve days after the onset, the eye was enucleated because the ulcer had perforated, causing the iris to prolapse. In this brief period, a highly elevated and sharply defined anterior-polar cataract developed, showing already a tendency to contract.

In a second case, the eye of a boy, aged 12 years, was removed three weeks after the onset of a perforated serpiginous ulcer. Here, instead of one patch of proliferation, there were three separate cataracts, each detaching the anterior capsule. The cells bordering the proliferated areas were scanty and exceedingly flat (fig. 10). They were apparently mature cells that had flattened in order to creep along the capsule and replace cells that had disappeared. It is known that newly formed epithelial cells have a directed growth and an inherent tendency to move toward a certain place (positive chemotaxis). It is likely that even fully mature cells may change their shape and show a similar phenomenon of motion. In this instance, the early stage of the formation of an anterior-polar cataract was revealed. The cells were small, compactly disposed, and rich in protoplasm. As yet no intercellular substance had been laid down.

In a third case, one of sympathetic ophthalmia, over-rapid proliferation was shown by the presence of many mitotic figures which resembled the atypical star figures seen in malignant growths (fig. 11). In the entire series, this case and another were the only ones in which mitotic figures were encountered.

3. Shape and Consistency of Subcapsular Cataracts

Three types of anterior-polar cataract were differentiated in this material: (a) the widespread type with an undulating anterior surface (fig. 12); (b) the pyramidal type projecting abruptly forward (fig. 13); (c) the thin, fibrous type with sharp wrinkles in the capsule (fig. 14). This classification was made according to the contours of the anterior surface. Posteriorly, the outline was always concave, conforming to the outline of the anterior surface of the nucleus. Apparently, the growing cells find it easier to detach the capsule than to indent the nucleus. In its fully developed state, an anterior-polar cataract shows few nuclei and a very abundant intercellular substance (fig. 15). It is indeed an "epithelial connective tissue." It may even have a fine lamination. The older the cataract the more homogeneous it is. Its toughness becomes manifest when attempts are made to tear it. Eventually, it may become calcified just like any ordinary connective-tissue scar. In the matter of staining, it differs from connective tissue in that it take a yellow instead of a red stain. Chemically, it has the property of the capsule.

4. Reaction to Irritation (Pyramidal Type of Cataract)

The pyramidal cataracts were usually associated with corneal ulcers, especially with those about to rupture. They were the result of short but concentrated exposure to toxins. Simultaneously with the rupture of the cornea come the release of the toxins from the anterior chamber and the arrest of the growth. By contraction, the isolated mass of proliferation

elevates itself and detaches the capsule. However, it affects but slightly the lens nucleus from which it separates easily, merely sliding on it. It may remain of the same size and whiteness throughout life.

An example of the effect of local irritation was a case of serpiginous ulcer in which a wide perforation of the cornea brought good drainage to the anterior chamber (fig. 16). At one point on the capsule, the cornea, with the advancing border of the ulcer, lay in direct contact with the lens, and proliferation of the subcapsular cells was confined to this point. The entire pupillary area of the lens was covered by a coagulum of pus and blood and, under this, the subcapsular cells were well preserved. In the study of the corneal ulcer cases, it was noted that a hypopyon may have the benign effect of forming a curtain that protects the subcapsular cells from the toxins eliminated by the bacteria in the cornea.

5. Reaction to General Irritation (Widespread Type of Cataract)

Extensive proliferation, sometimes reaching beyond the pupillary area, was characteristic of the cases of spontaneous detachment of the retina. An unusually widespread cataract was found in a woman's eye, blind for 25 years due to long lasting toxins from the subretinal fluid (fig. 17). The most interesting point was its association with a similar connective-tissuelike formation at the ora serrata which had been laid down by the pigmented epithelium. A similar tissue may be found posteriorly on the choroid when the retina has been long detached. Occasionally this tissue of epithelial origin may be found in all three locations in the same eye. They are all believed to be the result of a low grade reaction to a prolonged but not virulent stimulus.

6. Basal Cells of Posterior Polar Cataract

In a number of cases, a single layer of more or less cuboidal cells outlined and separated the subcapsular cataract from the lens substance. Being very nuclear, the layer stood out by contrast against the overlying homogeneous cataract. Treacher Collins[5] found that these

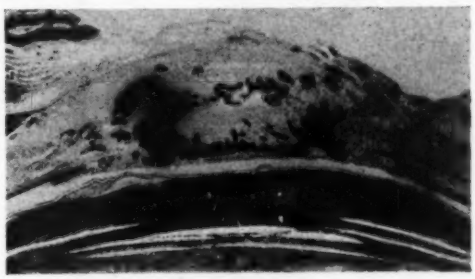
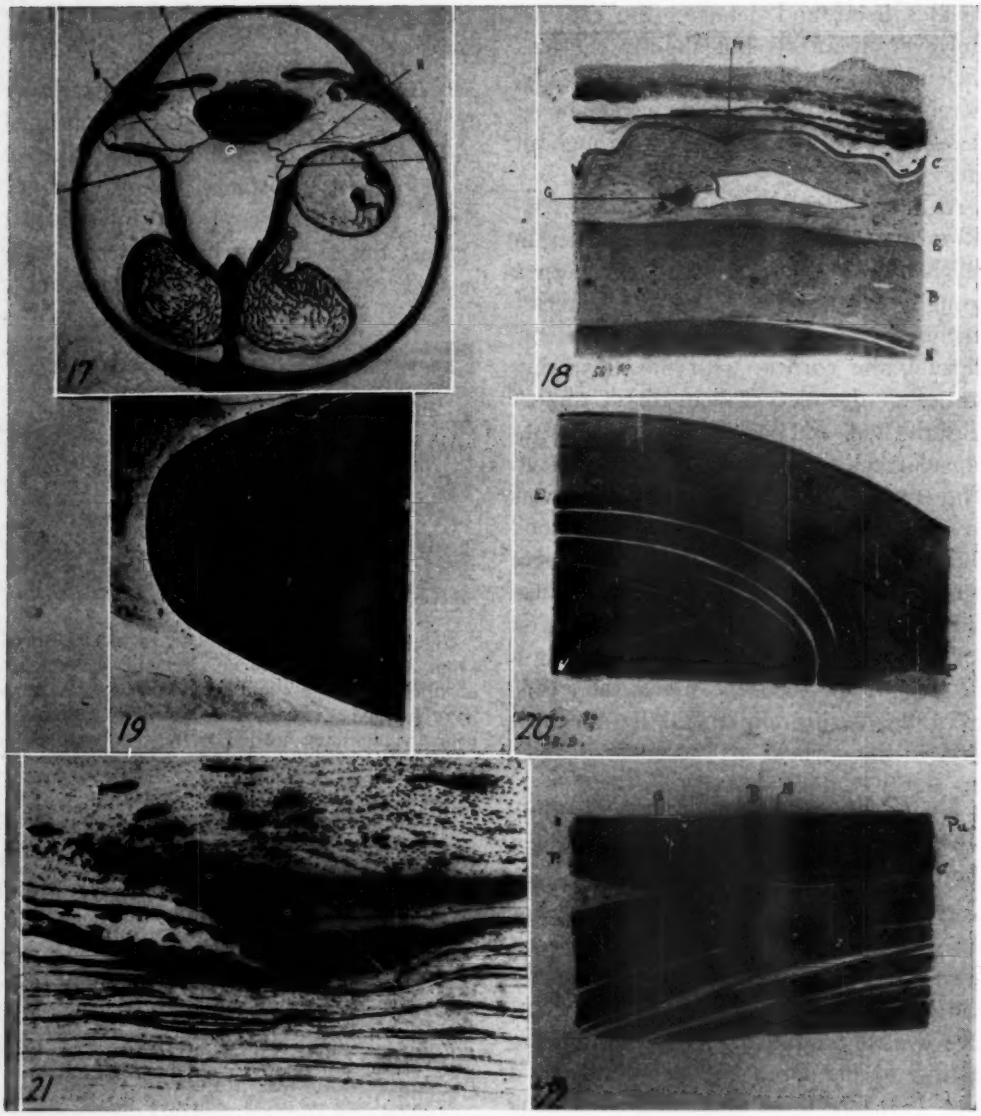


Fig. 16 (Samuels). The cornea has ruptured from a serpiginous ulcer, and the open space is filled with pus and blood. Two cataracts have formed, the larger one directly under the necrotic pupillary border of the iris over which is a posterior abscess in the cornea.

cells could secrete a glass membrane on the posterior surface of the cataract. In the specimens, the basal cells were found only in the late stages of the cataract (fig. 18). They never spread into the cataract and seemed never to have taken part in its formation. Evidently the subcapsular epithelium has a particular urge to wall off and isolate an abnormal mass.

7. Spread of Subcapsular Epithelium Posteriorly

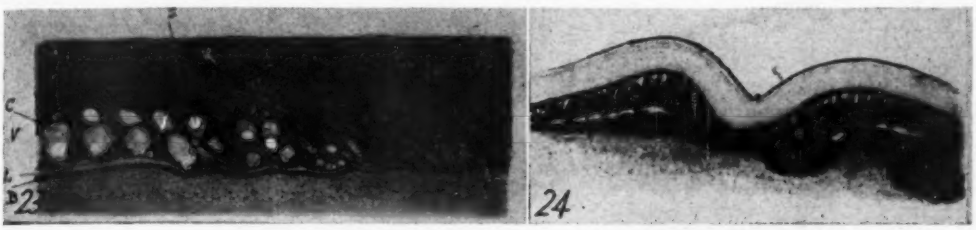
As long as the whorl of the germinal zone in which the epithelial system ends at the equator is preserved, it is not possible for the anterior capsular cells to proliferate posteriorly. However, when the germinal cells have disappeared or have fallen away from the capsule, the anterior cells may then take their place and grow



Figs. 17 to 22 (Samuels). Fig. 17. Anterior polar cataract caused by toxins from an old detachment of the retina. Fig. 18. Cystic space lined by flat cells in the midst of an old anterior subcapsular cataract. Fig. 19. The entire capsule is lined by a row of epithelial cells. The thicker capsule to the right is the anterior capsule. Fig. 20. The iris has become necrotic from the sudden cutting off of the circulation in acute glaucoma. Necrosis of the iris followed, causing also necrosis of the underlying subcapsular cells. Fig. 21. Nodules of a homogenous material (drusen) laid down by the subcapsular epithelium under the protection of the iris in a thwarted attempt to cover the denuded pupillary area to the left. Fig. 22. Pu points to the pupillary area and C to the capsule. I points to the iris, P to the pigment layer, and B to broken down pigmented cells. At N, there are desquamated epithelial cells under the capsule, and at G there is a tuft of proliferated cells.

backward to line the posterior capsule in one continuous layer. The migration backward was usually found in association with liquefaction of the entire cortical substance of the lens, in which condition the germinal zone no longer exists. This

was illustrated in a case of hydrophthalmos in which the substance was totally liquefied, the patient being only 22 years of age (fig. 19). The posterior capsule was lined by a single layer of epithelial cells, so that the two poles could be distinguished only by the difference in thickness of the capsules. In the group of cases of detached retinas, the proliferation backward was frequent as if the cells pupillary border but being unable to proceed into the denuded area, drew back upon themselves and laid down a homogeneous mass of lenticular shape. Again, in one of the glaucoma cases, a sudden and complete blocking of the angle cut off the blood supply to the iris and caused it to become necrotic (fig. 22). In turn, toxins from the necrotic pupillary zone of the iris, where it touched the capsule,



Figs. 23 and 24 (Samuels). Fig. 23. Vesicular cells along the posterior capsule. C points to the protoplasm of a cell and S to a cystic space in one of the cells. Fig. 24. Distorted subcapsular epithelial cells.

had a purpose to protect the lens from toxins coming from that direction.

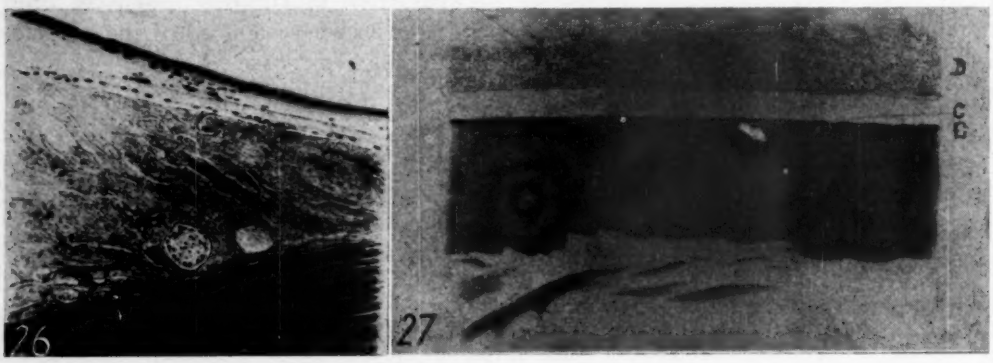
8. Proliferation to Repair Defects

Now and then in this long survey, the same lens showed both a stretch of necrosis and an attempt at repair by the adjoining cells (fig. 20). Among the causes of necrosis were toxins from a serpiginous ulcer, pressure of the lens against the cornea in glaucoma, toxins from a necrotic iris in touch with the capsule, and toxins from necrotic tumors. It became evident that it is a trait of the lenticular epithelium, like that of the corneal endothelium, to attempt to repair any defect in its continuity. Such an attempt was demonstrated in a case of lime burn of the cornea followed by a serpiginous ulcer (fig. 21). A purulent exudate filled the anterior chamber, causing the death of the central subcapsular cells. The adjoining cells, spared because they had been protected by the iris, multiplied at the killed the underlying epithelium. At a distance toward the periphery, where the aqueous separated the iris from the lens capsule, the living cells attempted to repair the damage but, being thwarted, proliferated in the form of tufts of cells.

B. Proliferation of the germinal cells (vesicular cells)

In the process of developing flat and slender fibers from the germinal cells at the equator, the cells are pressed against a wall of preëxisting lens fibers. It is pressure that helps to mold the newly formed cells into fibers. In the cases of retinal detachment, since the lens was so frequently liquefied, making the pressure equal in all directions, it followed that it was in this group that vesicular cells were found most often and in greatest abundance (fig. 23). They are large bladderlike cells with a faintly staining nucleus and protoplasm enclosed in a sharply defined cell border. Occasionally they are very much elongated because, after

all, they are but misshapen lens fibers. Their favorite site was at the equator, but often they were located along the posterior capsule, less often anteriorly as if they had been pressed in either direction in the liquid cortex. In the process of disappearing, they lose their nuclei and frequently merge to form a large cystic space, for they represent a phase in the development of a total cataract. They were found least often in glaucoma cases in which, as a rule, the lenses were the best preserved.



Figs 26 and 27 (Samuels). Fig. 26. Spherical body of epithelial elements floating in the liquid cortex. Fig. 27. Initial stage in the formation of an anterior polar cataract.

Metaplasia. Regarding metaplasia, the rapidity with which the epithelial cells changed their character, added to this property of contracting from the start (in one case 12 days), was astonishing (figs. 6 and 28). It was never certain that the anterior cells ever produced vesicular cells, nor was it certain that the germinal cells ever produced connective tissue. Whenever a cataract was found at the equator or posteriorly, it was considered to be the product of wandering anterior subcapsular cells.

C. Unusual findings

1. Distortion of Cells by Traction

In another case in the group of corneal scars, the capsular cells lost their normal cuboidal shape, became elongated, and took on a palisadelike arrangement due to traction exerted by the folded and detached capsule (fig. 24).

2. Drusen of the Capsule

In two cases, one in the group of spontaneous iritis and one in the group of intraocular tumors, the epithelium was detached from the capsule by a homogeneous, roundish mass hugging the capsule and taking a similar stain (fig. 25, color plate). It was surprising that only four druselike formations were encountered, showing their rarity.

3. Epithelial Sphere

Many times, desquamated cells were noted; and once, the germinal zone detached and fell into the liquefied cortex. In a lens of the group of retinal detachments, cellular elements had agglutinized and formed a large sphere (fig. 26) that in life must have floated about in the fluid, just as an aggregation of endothelial cells may swim freely in the aqueous or attach itself to the iris and propagate.

4. Incipient Subcapsular Cataract (Anterior-Polar Cataract)

In a case of malignant melanoma of the choroid, the only changes noted were two small foci of cells under the anterior

capsule. They resembled giant cells with their many nuclei and homogeneous protoplasm (fig. 27). It was considered that they represented the initial stage in the formation of an anterior-polar cataract.

5. Absence of Epithelial Cells

In only two cases among the 185 examined was there a complete absence of epithelial cells. A "dead lens" in the strict sense of the word must be considered one of the rarest of intraocular pathologic findings.

Summary

The lenses that showed the greatest proliferation belonged in the groups of corneal scars, spontaneous iritis, and detachment of the retina. These were the eyes in which a low-grade, chronic alteration in the metabolism had existed over the longest period.

The lenses that showed the least proliferation belonged in the groups of intraocular tumors and glaucoma. Death of the cells characterized the tumor cases, owing to the irritant poisons eliminated by the tumors as they became necrotic.

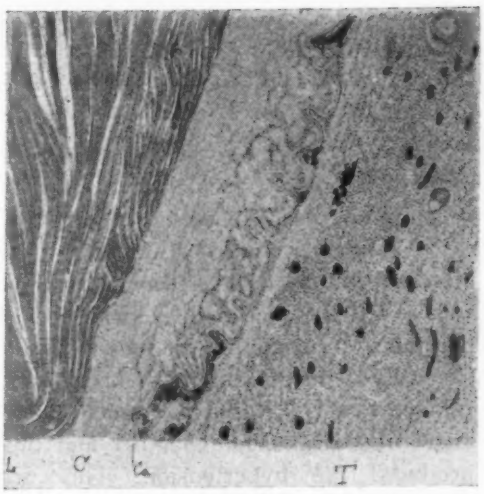


Fig. 28 (Samuels). A case of tuberculosis of the cornea. The anterior chamber is filled with granulation tissue containing giant cells. An extensive anterior-polar cataract has thrown the lens capsule into numerous deep folds.

That multiplication of cells was seldom seen in the glaucomatous globes was probably due to the fact that the cells were compressed between the swollen lens substance and the distended capsule. This may be the reason that, in glaucoma cases, an anterior-polar cataract is a clinical rarity.

57 West 57th Street.

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GLAUCOMA CAPSULARE*

HARRY S. GRADLE, M.D., AND H. SAUL SUGAR, M.D.
Chicago

Some 20 years ago, Vogt coined the term "Glaucoma Capsulare" to describe a condition that he had observed in 17 cases. These presented a more or less typical form of simple glaucoma, to which was added the picture of exfoliation of the anterior capsule of the lens. He very shrewdly deduced that the debris of exfoliated material closed the outlets of the angle of the anterior chamber and thus produced the hypertension. This was purely theoretical on his part, for no gonioscopic examinations were made of these patients. He thought correctly, however, for the examination of the angle of the anterior chamber has suggested that his deductions are correct and but little has been added to the picture as he originally described it. Time, experience with a larger number of patients, and refinement of methods of examination have rounded out the picture so that today the disease known as Glaucoma Capsulare, may be regarded as an entity. The present total number of cases studied by us is 77, an addition of 26 to our previous series.

Before discussing the condition itself, it might be well to speak of its etiologic aspect, namely exfoliation of the anterior capsule of the lens. This in itself has been known for well over 100 years, although not in its relation to the disease under discussion, and has been the subject of much investigative work. The historic phase and the large bibliography were discussed in an article by Gradle and Sugar[1] and consequently need not be repeated here. The observations made previously as to racial incidence have been amplified slightly. So far, we have seen only two instances of Glaucoma Capsulare in Negro Americans. The previous high incidence of Glaucoma Capsulare in patients of Greek birth (8 patients, 15.7 percent) of the original series, remained the same (12 patients, 15.6 percent) in the enlarged series. This is interesting in view of Trantas' finding of exfoliation in 18 percent of 237 Greek patients over 55 years of age.

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ZONES OF CAPSULAR EXFOLIATION

Capsular exfoliation occurs in a relatively small number of patients, usually past the age of 55. It is manifested as an elevated scruffing on the anterior surface of the anterior lens capsule which represents a separation and opacification of the anterior layers of the anterior lens capsule. In all likelihood the condition is a result of senile degeneration, although the frequency of unilateral occurrence places some doubt on this idea (18 cases in this series).

The capsular exfoliation occurs in five distinct zones of the capsule. One, and sometimes two of the five, can be seen *only* gonioscopically. They may be listed as follows:

Zone I. There is a central annular disc on the anterior capsule of the lens, varying from 1 to 2.5 mm. in diameter. This is fairly translucent and usually homogeneous, although there may be a few white specks near the periphery. The edges are sharp and sometimes have a tendency toward curling. The size of the disc is apt to depend upon the size of the pupil, and it is sufficiently transparent so that there is no interference with vision.

Zone II. This is a fairly narrow, clear zone that surrounds the central disc. There is never any uniform opacity in this area, but mainly capsular shreds that are apt to be disengaged from their base. The semiopaque shreds are frequently arranged radially, corresponding possibly to the radial folds of the posterior surface of the iris. Owing to the movements of the iris under normal light stimuli, the exfoliations of this zone are usually partly or completely rubbed off, leaving the area clear. It is most probable that the majority of the shreds found floating in the aqueous have their origin from this area.

Zone III. This zone varies in size and, in the untreated eye, appears to begin about 3 mm. from the axis of the lens. It extends fairly well into the periphery, depending upon the extent to which the posterior surface of the iris is in contact with the anterior lens capsule. The entire area of the zone is apt to be involved, and the appearance of the exfoliations suggested the original term of "Kapselhautchen." In other words, it appears to be a fairly opaque membrane that resembles a very fine gray and white honeycomb. The central edge is frequently lifted and curled and from this edge come some of the capsular shreds that are found free in the aqueous, as is shown by the irregular and frayed character of the axial edge.

Zone IV. Extending well up to the anterior insertion of the zonule of Zinn fibers is this narrow translucent zone with only irregular radial opacifications from Zone III extending into its axial portion. This zone can be seen only through a coloboma of the iris or else gonioscopically in iridectomized eyes. It does not play any role in the production of glaucoma.

Zone V. This lies around the equator of the lens between the insertions of the anterior and posterior zonule fibers. The exfoliation here is the same as in Zone III. However, it seems unlikely that the exfoliations here are much concerned in the production of Glaucoma Capsulare. Opacification of the zonule fibers, themselves, is always present, when visible gonioscopically.

When the exfoliations are still adherent to the capsule from which they originate, their appearance varies from thin, flocculent shreds to that of a semicystic membrane that resembles a very fine mesh honeycomb. Histologically, it has been proved by numerous investigators that the exfoliations represent the outermost laminae of the anterior capsule of the lens. These are elevated by the development of vacuoles within the anterior layers of the capsule as was shown by Sobhy Bey in 1932.[2] The vacuoles then rupture under the influence of the rubbing movements by the posterior surface of the iris and the broken edges retract and curl up. As the movements continue, the exfoliations become loosened and float away in the normal aqueous current. It was interesting to note that, in one unoperated patient who had been on miotics for six years during the war, further vacuole formation occurred in the clear area of Zone II and was not rubbed off due to immobilization of the iris.

Apart from their appearance on the lens capsule, shreds of exfoliations of the capsule are frequently seen adherent to the iris. They seem to be somewhat tenacious in character and frequently become adherent to whatever portion of intraocular tissue with which they come into contact. As a result, the majority of the shreds are found on or around the pupillary border of the iris in a fairly fixed position. Occasionally one can be seen lying on the anterior surface of the iris. In some instances, we have seen them

adherent to the posterior surface of the cornea, either in the central areas or in the chamber angle.

Thus is explained the origin of what may be termed "foreign matter" in the anterior chamber of the eye. As the natural flow of the aqueous is toward the angle of the anterior chamber, it is perfectly proper to recognize that such foreign particles, aided by gravity and convection currents, will eventually come to lodge in the angle. The presence of these exfoliated shreds on the trabecular wall has been shown gonioscopically. In addition, there is always present a dense pigment ring due to the deposition of rubbed-off pigment granules in the trabecular spaces. The presence of both probably causes mechanical blockage of the spaces.

It stands to reason that not every case of exfoliation of the anterior lens capsule will develop hypertension, as Vogt originally contended. As the exfoliated material and pigment gradually block the trabecular spaces, the normal amount of drainage of the aqueous is lessened. But that decrease is compensated for by drainage through the remaining open spaces and probably by absorption through the crypts of the anterior surface of the iris. Only when the total drainage area has been reduced to a point where the production of the aqueous is greater than the possible elimination, does the intraocular pressure begin to increase. The process is slow, however, and probably requires years before the balance of intraocular pressure is disturbed. Consequently, there is no sudden rise in tension such as is found in an acute blockage of the chamber angles, but rather a slow increase in pressure with consequent vascular compensation.

Coincidental acute glaucoma

In only two cases of capsular exfoliation have we seen acute glaucoma occur. Both had shallow chambers and angles and should be considered as "primary" acute glaucomas and not as Glaucoma Capsulare. The exfoliation was probably coincidental in each instance.

The case histories of the patients with capsular exfoliation and coincidental acute glaucoma follow:

Case 1. C. C., aged 66 years, experienced a sudden attack of acute pain in his left eye and noticed rings around lights on May 18, 1940. This patient was seen at the Illinois Eye and Ear Infirmary four days later. The tonometric readings were 25 mm. Hg (Schiøtz) for the right eye; and 73 mm. for the left. All the typical findings of a congestive attack of acute glaucoma were present in the left eye. Both anterior chambers were shallow. Capsular exfoliation was present in each eye. The left eye did not respond to miotic therapy but remained normal after an iridectomy.

Case 2. J. F., aged 71 years, suddenly noticed poor vision in his right eye in September, 1939. On examination the tonometric reading for the right eye was 60 mm. Hg (Schiøtz). Both anterior chambers were shallow. Eserine rapidly brought the tension to 32 mm. Typical capsular exfoliation was present in the right eye only. The lens of the right eye was cataractous and was operated upon. In spite of an open angle, the right eye responded like most eyes with Glaucoma Capsulare with slightly increased tension.

In March, 1946, the patient was being prepared for removal of a cataract from the left eye, the one without capsular exfoliation. Preoperative dilatation of the pupil of the left eye caused an elevation of tension from 25 to 49 mm. Hg (Schiøtz) in two hours and return to normal after eserine.

In two other cases, vascular decompensation occurred, probably as a break in the vascular compensation of a previously long-standing Glaucoma Capsu-

lare. In these cases, the chambers were deep and the angles open. In one case, that of J. L., aged 65 years, there were no symptoms except for decreased vision over a long period, until three weeks before examination in 1939. At this time, the left eye became painful. The vision was 9/200 in this eye and could not be improved. The lens was clear. The disc was deeply cupped. There was no evidence of any abnormal narrowing of the angle. In the second case, that of J. P., aged 65 years, in 1938, the visual acuity of the left eye began to decrease 13 years previously. Two years later the eye was amaurotic. There was no pain until February, 1936, when the tension of the left eye was 77 mm. Hg (Schiøtz). The eye was red without evidence of an inflammatory or angle-block basis. A trephining operation was done on this eye.

In just what percentage of cases with capsular exfoliation glaucoma develops, it is impossible to say. In our series of 77 cases of exfoliation, glaucoma developed in 63 (81.8 percent). In the literature, the incidence varies from 14.0 percent (Alling[3]) to 90.0 percent (Busacca[4]). Inasmuch as the exfoliation usually can be detected only with slitlamp or loupe, and then often requires pupillary dilatation, it will be necessary to examine many thousand patients to determine the exact percentage that develop glaucoma. One of us (H. S. G.) has followed a patient with capsular exfoliation for 18 years and has never found hypertension, nor has her lens opacity progressed to a point necessitating extraction. On the other hand, we have observed the development of glaucoma in four patients with exfoliation after several months of observation. We may not say with any degree of certainty that the presence of capsular exfoliation always presumes the eventual development of glaucoma but, at least, glaucoma does occur in a large percentage of cases.

Conversely, we do not know what percentage of cases diagnosed as simple glaucoma are of the type which are really Glaucoma Capsulare. In our previous series of simple glaucoma in the glaucoma clinic of the Illinois Eye and Ear Infirmary, there were 331 cases up to July 31, 1940, as compared to 46 cases with Glaucoma Capsulare. It appears that about 7.2 percent of the cases heretofore diagnosed and treated as primary simple glaucoma are, in reality, secondary glaucoma of the type known as capsular and requiring, in many instances, a different form of therapy.

Differentiation between simple glaucoma and Glaucoma Capsulare

There are but few distinguishing characteristics between primary simple glaucoma and Glaucoma Capsulare as regards their course, and these have to be detected by slitlamp and gonioscopic study. Both conditions are insidious in nature, and patients having each type are often not seen until one eye has become totally blind. There is a tendency to spontaneous and operative dislocation of the lens and to the occurrence of asteroid hyalitis in eyes with capsular exfoliation, not in simple glaucoma. Asteroid hyalitis was present in 7 patients of the 77 examined by us. In two, there was spontaneous dislocation of one crystalline lens. In several, the dislocation occurred just after section during cataract operations. In those instances where the capsular exfoliation was unilateral, the vitreous opacities were present only in that eye and not in the normal eye.

The visual acuity and visual field changes that develop are comparable to those of simple glaucoma; they are due to the influence of pressure, purely and simply. However, in Glaucoma Capsulare there is apparently a tendency for the pressure changes to occur with lower intraocular pressure, even pressures ordinarily

considered to be within normal limits. An example of such a case follows:

W. K., aged 78 years in 1939, had noticed, in 1936, that vision in the right eye, previously normal, was entirely gone. When seen at the Infirmary in February, 1937, the right eye was amaurotic; vision in the left eye was 20/20. The tonometric readings were 44 mm. Hg (Schiøtz) for the right eye; 29 mm. for the left. The visual field of the left eye for a 3 mm. white target was normal. Tension in the left eye thereafter remained between 16 mm. and 28 mm. (28 once), yet the visual fields gradually decreased, concentrically, to 50 degrees, temporally, and 40 degrees, nasally, with the same target. Visual acuity remained at 20/30 until last seen in March, 1943.

Provocative tests in cases of Glaucoma Capsulare give the same results as in simple glaucoma (except, of course, in mixed cases). Anterior-chamber puncture was positive, while dilatation tests were negative in the following case:

J. U., aged 75 years, began to notice failing vision in 1936. When examined at the Infirmary in April, 1939, the visual acuity was 3/200 right and 20/25 left, corrected. Tonometric readings were 24 mm. Hg (Schiøtz) for the right eye; 48 mm. for the left. On miotics the tension remained controlled, usually. Provocative dilatations with euphthalmine and homatropine were negative. Anterior-chamber puncture of the right eye gave the following results: Tension before puncture 23 mm.; tension one-half hour after puncture 10 mm.; one hour after puncture 21.5 mm.; 1½ hours after puncture 60 mm.; two hours after puncture 60 mm.; 2½ hours after puncture 60 mm. The aqueous volume removed on puncture was 0.24 c.c.

In another case of Glaucoma Capsulare with shallow anterior chambers, the response to anterior-chamber puncture was of the type usually obtained in eyes with simple glaucoma with very shallow chambers.[5] This patient, E. McD., aged 75 years, was seen at the Infirmary in August, 1939. There was negative response to pupillary dilatation with euphthalmine and homatropine. Anterior-chamber puncture of the right eye gave the following results: Tension before puncture was 28 mm. Hg (Schiøtz). Withdrawal of 0.15 c.c. of aqueous was followed by tonometric readings of 8 mm. in one-half hour; 28 mm. in one hour, 32.5 mm. in 1½ hours; 37.5 mm. in two hours; and 35 mm. in 2½ hours.

With the slitlamp, exfoliated shreds may be seen adherent to the posterior surface of the cornea, usually nearer the periphery than the center. Similar small shreds may be found floating in the convection currents in the anterior chamber. The appearance of capsular material adherent to the iris was mentioned previously, but care must be taken to differentiate these shreds from the small gray nodules or tags that are seen so frequently in chronic cyclitis. Free pigment granules are seen very frequently. They may be adherent to the posterior surface of the cornea, may be floating freely in the aqueous, or may lie on the surface of the iris. Such granules are very minute, are light brown in color, and do not seem to have any tenacious qualities.

With the gonioscope itself, the differentiation between Glaucoma Capsulare and simple glaucoma is usually possible. In both types, the angle is usually of normal depth, at least in unmixed cases. In Glaucoma Capsulare, the angle usually presents a more or less characteristic appearance of slight veiling due to the presence of exfoliated lens-capsule material and a characteristic dense, trabecular pigment ring produced by the deposition of pigment granules in the trabecular spaces.

Adhesions are not usually present in the chamber angle in unoperated cases of Glaucoma Capsulare, except in the few instances where congestion has supervened in long-standing cases. Even after operative procedures have been performed, there is comparatively little tendency for the formation of these adhesions, probably due to the insulating effect of the minute capsular particles on the angle wall.

In addition to the above findings in the anterior segment, changes occur in the lens and vitreous. The lens contained within the capsule may be perfectly clear, but usually shows beginning opacities, not infrequently of the posterior-subcapsular type. Among the characteristic findings of a true Glaucoma Capsulare, these lenticular opacities play no diagnostic roles. However, more or less degeneration of the vitreous is always present. This may be comparatively minor and represented only by slight degeneration of the normal fiber structure; or again, there may be extensive degenerative changes, including asteroid hyalitis, or marked fluidity. In a large share of the cases, there is sufficient opacity of the lens so that the vitreous cannot be studied accurately and only when the lens is removed will the degenerative phases of the vitreous become manifest.

Cupping of the optic nerve heads proceeds apace with the amount and duration of the hypertension. As is well known, an acute increase in pressure does not cause a pathologic excavation of the disc. This results only from long-continued pressure that is above the resistance point of the lamina. The visual-acuity and visual-field disturbances that are found in Glaucoma Capsulare are a direct result of the pressure increase and resultant cupping of the nerve head.

The successful management of Glaucoma Capsulare requires rather keen judgment on the part of the ophthalmologist. The majority of cases require surgical interference, and the patient must be carefully informed that vision can only be maintained at its present level, as far as the effects of the glaucoma itself are concerned, but not improved. A few cases can be controlled successfully by the use of a miotic of sufficient strength and frequency of instillation to hold the pupil contracted and rigid. The effect in those cases is the same as in simple glaucoma but, in addition, there is resultant failure to rub off any more exfoliated material, thus preventing further clogging of the trabecular spaces. Only in the early cases, however, and in those in which the hypertension has caused but little damage is that treatment adequate.

In many cases, some form of surgical procedure is indicated. If cataract is present, lens extraction should be performed if the tension can be reduced preoperatively. Otherwise, a cyclodialysis or filtering operation must be performed first. Since there is a tendency for the drainage path to be closed by further exfoliated shreds carried there from the lens surface by the newly diverted current of the aqueous, any glaucoma operation must be followed by the constant use of miotics to prevent further exfoliation from the capsule. In view of the tendency for progressive loss of vision and field even without much elevation of intraocular pressure, surgery should be resorted to if definite progressive field changes are found.

It is interesting that, in spite of the idea that lens extraction is advocated in the treatment of Glaucoma Capsulare, the actual lens removal has no great effect on the ocular hypertension. Of 16 eyes in which the lenses were removed, 14 had tonometric readings of over 30 mm. Hg (Schiøtz), as indicated in Table 1, at least once postoperatively. Fortu-

TABLE 1

RESULTS OF LENS REMOVAL IN GLAUCOMA CAPSULARE CASES AT THE ILLINOIS EYE AND EAR INFIRMARY

Name	Highest Tension Preoperatively mm. Hg (Schiøtz)	Type of Operation	Description of Chamber Angle, Postoperatively	Highest Tension, Postoperatively	Method Used to Relieve Tension
1. C.G.	45	Extracapsular	—(1937)	52	Cyclodialysis plus miotics
2. J.F.	60	Extracapsular	Partly open	38	Miotics
3. G.D. (R)	32	Intracapsular (vitreous loss)	Partly open, obliterated only in wound area	37.5	Miotics
4. G.D. (L)	76	Intracapsular (vitreous loss)	Palpebral fissure too small	46	Cyclodialysis repeated
5. B.P. (R)	26	Intraocular	Partly open	32	Miotics
6. B.P. (L)	32.5	Loop	Open below, obliterated upper half	32.5	Miotics
7. F.U. (R)	45	Extracapsular	Partly open	33	Miotics
8. F.U. (L)	32	Extracapsular	Partly open	35	Miotics
9. J.P.	48	Extracapsular	Open below, closed upper half	53	Miotics
10. M.S.	19	Extracapsular	Partly open, partly trabecular adhesions	52	Miotics
11. T.F. (R)	35	Intracapsular	Not seen	30.5	Miotics
12. T.F. (L)	48	Extracapsular	Partly open	30.5	Miotics
13. A.T. (R)	40 (normal after trephining)	Extracapsular	Partly open	33	Miotics
14. C.C. (L)	73 (normal after trephining)	Extracapsular	Partly open	29	None
15. A.McK. (L)	24	Intracapsular	Not seen	10 (1 month followup)	None
16. E.McD. (R)	28.8	Extracapsular	Open except for trabecular adhesion	38	Miotics

nately 12 were controlled with miotics and only two required cyclodialysis. Of course, removal of the lens does remove the possibility of further exfoliation and further trabecular blockage, but lens removal in cases of capsular exfoliation is not without danger because of the great tendency toward lens dislocation and the loss of fluid vitreous, especially with intracapsular operations.

Such is the picture of the clinical entity now recognized fully and known as Glaucoma Capsulare. Only time can tell how frequently the condition occurs. Certain

it is that Glaucoma Capsulare is not rare and that we must be on guard to prevent overlooking the diagnostic points.

58 East Washington Street (2).

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ESERINE: ITS HISTORY IN THE PRACTICE OF OPHTHALMOLOGY*

(PHYSOSTIGMINE: PHYSOSTIGMA VENENOSUM (BALFOUR): (CALABAR BEAN)

FRANK H. RODIN, M.D.

San Francisco

No drug employed in the practice of ophthalmology offers such a fascinating story to the medical historian as eserine. By the irony of fate this substance, which was used as an ordeal poison by primitive peoples, later proved to be one of the most effective agents in therapy of the eye. The natural product from which the drug was derived is Physostigma venenosum (Balfour) or Calabar bean. After extensive experimentation and observation, the active principle physostigmine was isolated by Fraser[1] in 1863, and made to serve a great variety of medical therapeutic needs. Foremost among these was oculotherapy, and at the present time eserine (physostigmine) maintains an unchallenged place as a miotic.

The need of a miotic was recognized by the early ophthalmologists and, as late as 1861, Stellwag von Carion[2] in his famous textbook lamented the fact that: "We possess no means of effecting contraction of the pupil." Synthesis of the drug was accomplished in 1935 by Julian and Pikl.[3]

Trial by ordeal is a practice of extremely ancient origin. It may be generally stated to have been exercised in every country and by every race from early barbarity and to persist to some degree even today. The ancient annals of Greece (Antigone of Sophocles, volume 270) tell of its existence. The Bible contains one of the earliest accounts of such a trial, at which a "cup of bitter water" was commanded to be drunk for the detection of conjugal unfaithfulness (Book of Numbers, chapter 5, verses 17-31). In Hindustan, China, Japan, Java, the Canary Islands, and many other lands, various forms of ordeal were, and perhaps still are, utilized. In Europe, notably in England, the practice remained in force until the 13th century, when, during the reign of Henry III, a law was reportedly passed for its abolishment (Blackstone's Commentaries, volume 4).

Ordeals may be classified under two great headings: those in which application is external, and those in which it is in-

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* From the Division of Ophthalmology, Stanford University School of Medicine.

ternal. The first class includes the well-known trials by fire, water, combat, and the balance. The second, comprising perhaps the most curious and interesting forms, encompasses a large section of the vegetable ordeal poisons. Some of these are beans, nuts, barks, roots, and trees, and it is to this group that the Calabar bean belongs.

Calabar bean is the seed of a leguminous plant, Physostigma venenosum (Balfour), indigenous to tropical Africa. The climbing plant grows to a height of about 50 feet on a stem one to two inches thick. The seed pods are six to seven inches long, each containing two or three chocolate-colored seeds or beans about the size of a broad bean. Nothing in the appearance, taste, or smell of the Calabar bean distinguishes it from the harmless varieties which it resembles.

Physiologic effects

Eserine does not affect unbroken skin. Ingestion of it at first greatly increases salivation by its direct action on secretory cells; then arrests it, due to the constricting effect of the drug on the blood vessels supplying the salivary glands. The secretion of bile, tears, and sweat is likewise affected. A rise in blood pressure occurs. The pharynx becomes constricted, and vomiting and purging ensue. The spleen, uterus, bladder, and iris are also involved. Early, the heart beat is reduced in rate secondary to stimulation of the terminals of the vagus nerve; later, depression of the intracardiac motor ganglia prolongs diastole and eventually halts the action of the heart in dilatation. The initial influence of eserine on respiration is that of acceleration, owing to stimulation of the pulmonary ending of the vagus. This condition is supplanted by retardation and ultimate arrest of breathing when paralysis of the respiratory center in the medulla oblongata takes place, enhanced by contraction of unstriped muscular tissue in the bronchial tubes and accumulation of increased bronchial secretion. Action on muscular tissue is direct, since it can occur in the presence of motor-nerve paralysis, and very large doses are required to produce voluntary-muscle intoxication or tremor.

The medulla is apparently the highest level of the brain affected by eserine, and consciousness is not altered. However, spinal-cord reflexes are abolished due to the direct influence of the drug on the cells of the anterior cornua. Reduced sensitivity shortly before death corresponds to sensory-cord paralysis.

Daniell,[4] a British Army medical officer stationed at Calabar, was first to observe the use of the Calabar bean. William Freeman Daniell was born in Liverpool, in 1818. In 1841, he became a member of the Royal College of Surgeons of England, and entered the medical service of the British Army. He served on the pestilential coast of West Africa and returned to England in 1863. Later, he accompanied the "Expeditionary Force" to China, and was present at the taking of Pekin. A short time afterward he travelled to West India; on his next homecoming his health was broken, and he died in 1865.

While in foreign service, Daniell collected and described many native plants. His publications are concerned with the plants, trees, shrubs, and their fruits which were indigenous to the countries visited by him. One of his treatises deals with the Katemfé or miraculous fruit of the Sudan, which was afterward named *Phrynium Danielli*, Benn., in compliment to the botanist who first studied it.

Daniell first observed the use of the Calabar bean in native judicial procedure about 1840. A communication read by him before the Ethnological Society of Edinburgh, in 1846, contains the first

known record of its application.

Old Calabar (fig. 1) is a district of West Africa in the neighborhood of the Bight of Biafra, which extends along the course of a large river, the Rio Calbary, Old Calabar, or Oude Calburgh. It is situated between 4 and 8 degrees North latitude, and 6 and 12 degrees East longitude; its estimated length is 100 miles and its breadth, 50.

Fig. 1 (Rodin). Map showing location of Calabar (center of the circle). It is located on the river Calabar, a district of West Africa in the neighborhood of the Bight of Biafra.

Calabar was the name given by the Portuguese discoverers of the 15th century to the tribes of this part of the Guinea coast. It was not until the early part of the 18th century that the Efik, after the civil war waged against the Ibibio, migrated from the neighborhood of the Niger to the shores of the River Calabar. The native inhabitants are still mainly Efik. For several generations, they were middle men between the white traders on the coast and the tribes of the Cross River and Calabar district. Until 1904, Calabar was generally and officially known as Old Calabar to distinguish it from new Calabar, the name of a river and port, some distance to the east.

Old Calabar was a despotic monarchy, whose court of justice was composed of its king and elders. Prisoners judged by this body and decided guilty of certain offenses were obliged to swallow a deadly poison. This poison was obtained by grinding and macerating in water the seeds of the Calabar bean, called Esére by the natives, until the solution was milky white. After the prisoner had swallowed the poison, he was made to walk continuously until the poison took effect. If, however, after the lapse of a prede-

termined period the accused vomited the poison, his innocence was considered vindicated, and he was freed of his charge.

Robert Christison[5] (fig. 2), in 1855, was first to experiment with the Calabar bean. He was born in Edinburgh, in 1797, the son of a professor of humanity

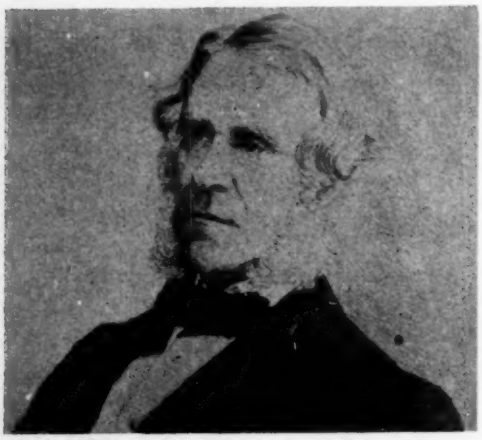


Fig. 2 (Rodin). Robert Christison who was the first to experiment with the Calabar bean.

(Latin) at the University of Edinburgh. He became interested in toxicology, and between 1822 and 1832 held the chair of medical jurisprudence at the University. His reputation as a medical jurist was well established by his famous book, *A Treatise of Poisons,* published in 1829. In 1832, he was transferred to the chair of materia medica, which he held for 45 years. His studies in this field earned him a reputation at least equal to that which he had won in medical jurisprudence. In 1842, he published his famous "dispensatory," giving in great detail the obvious effects that followed the administration of remedies in disease and laboratory classification of them. As chairman of the Committee of the General Medical Council, he helped to harmonize the pharmacopoeias of England, Scotland, and Ireland into a National Codex.

Christison was twice president of the Royal College of Physicians in Edinburgh and was also elected president of the Royal Society of Edinburgh. A baronetcy was conferred upon him in 1871. He became a famous practitioner, with one of the largest and most lucrative practices in Scotland. He died in 1882. Among the many honorary appointments bestowed upon him were member of the Pharmaceutical College of New York, member of the American Philosophical Society, and associate of the American College of Surgeons of Philadelphia.

Christison's interest in the Calabar bean was aroused when a missionary sent him one which two of his colleagues cultivated for him. He not only tried the seed on animals, but ate some of it himself. His description of his experience is so animated and charming, and portrays so vividly the character of the experimenter, that I shall let him speak for himself.

> Having ascertained the mode of death from the action of the ordeal-bean, I did not consider it advisable to study further the details of its action by means of experiments on animals, because I had been fully informed as to this in a more precise manner by an experiment made with the bean in my own person. I shall conclude this notice with an account of what I experienced; and I trust the details will not appear needlessly minute, as they seem to me to establish an action of a very singular kind in the case of this poison, and one of which we might discover other instances among known poisons, had we equally precise opportunities of determining the true phenomena.
>
> Having some doubts whether I had obtained the true ordeal-poison, as it tasted so like an eatable leguminous seed, I ate one evening the eighth part of a seed, or six grains, about an hour after a very scanty supper. During an hour that I passed in bed reading, I could still observe no effect whatever, and next morning I could still observe none. I am now satisfied. however, that a certain pleasant feeling of slight numbness in the limbs, like that which precedes the sleep caused by opium or morphia, and which I remarked when awake for a minute twice or thrice during the night, must have been owing to the poison.
>
> On getting up in the morning I carefully chewed and swallowed twice as much, viz., the fourth of a seed, which originally weighed

forty-eight grains. A slight giddiness, which occurred in fifteen minutes, was ascribed to the force of the imagination; and I proceeded to take a warm shower bath; which process, with the subsequent scrubbing, might take up five or six minutes more. The giddiness was then very decided, and was attended with the peculiar, indescribable torpidity over the whole frame which attends the action of opium and Indian hemp in medicinal doses. Being now quite satisfied that I had got hold of a very energetic poison, I took immediate means for getting quit of it, by swallowing the shaving water I had just been using, by which the stomach was effectually emptied. Nevertheless I presently became so giddy, weak, and faint, that I was glad to lie down supine in bed. The faintness continuing great, but without any uneasy feeling, I rung for my son, told him distinctly my state, the cause, and my remedy—that I had no feeling of alarm, but that for his satisfaction he had better send for a medical friend. Dr. Simpson, who was the nearest, reached me in a few minutes, within forty minutes after I ate the seed, and found me very prostrate and pale, the heart and pulse extremely feeble and tumultuously irregular; my condition altogether very like that induced by profuse flooding after delivery; but my mental faculties quite entire, and my only sensation that of extreme faintness, not, however, unpleasant. Dr. Simpson judged it right to proceed at once for Dr. Douglas Maclagen as a toxicological authority, and returned with him in a very few minutes.

In his absence, feeling sick, I tried to raise myself on my elbow to vomit, but failed. I made a second more vigorous effort, but scarcely moved. At once it struck me—"this is not debility, but volition is inoperative." In a third effort I was more nearly successful; and in the fourth, a resolute exercise of the will, I did succeed. But I could not vomit. The abdominal muscles acted too feebly; nor were they much aided by a voluntary effort to make them act. I then gave up the attempt, and fell back, comforting myself with the reflection that vomiting was unnecessary, as the stomach had been thoroughly cleared. At the same time the sickness ceased, and it never returned. There were now slight twitches across the pectoral muscles. I also felt a sluggishness of articulation, and, to avoid any show of this, made a strong effort of the will to speak slowly and firmly, through fear of alarming my son, who was alone with me.

Dr. Maclagen, on his arrival, thought my state very like the effects of an overdose of aconite. Like Dr. Simpson, he found the pulse and action of the heart very feeble, frequent, and most irregular, the countenance very pale, the prostration great, the mental faculties unimpaired, unless perhaps it might be that I felt no alarm where my friends saw some reason for it. I had, in fact, no uneasy feeling of any kind, no pain, no numbness, no prickling, not even any sense of suffering from the great faintness of the heart's action; and as for alarm, though conscious I had got more than I had counted on, I could also calculate, that, if six grains had no effect, twelve could not be deadly, when the stomach had been so well cleared out.

Presently my limbs became chill, with a vague feeling of discomfort. But warmth to the feet relieved this, and a sinapism over the whole abdomen was peculiarly grateful when it began to act. Soon afterwards the pulse improved in volume, but not in regularity. I was now able to turn in bed; and happening to get upon the left side, my attention was, for the first time, directed to the extremely tumultuous action of the heart, which compelled me to turn again on the back, to escape the strange sensation. Two hours after the poison was swallowed, I became drowsy, and slept for two hours more; but the mind was so active all the while, that I was not conscious of having been asleep. On awaking, the tumultuous action of the heart continued. In an hour more, however, I took a cup of strong coffee; after which I speedily felt an undefinable change within me, and on examining the condition of the heart, I found it had become perfectly and permanently regular.

For the rest of the forenoon I felt too weak to care to leave my bed; and on getting up, after a tolerable dinner, I was so giddy as to be glad to betake myself to the sofa for the evening. Next morning, after a sound sleep, I was quite well.

It is interesting that, while Christison was under the effect of the drug, he did not notice its action on the eye.

Typical of the old professors of Edinburgh, who were not only scientists and teachers but philosophers as well, Christison made the following observations concerning the possible use of the Calabar bean for the execution of criminals.

Let me advert lastly to a peculiarity in the action of the ordeal-bean which struck me forcibly while labouring under it. Philosophers have thought it not unworthy of inquiry, how in criminal executions death may be completed without physical suffering to the criminal. Governments have even consulted science on the subject. But science has not yet satisfactorily solved the question. Meanwhile, I suspect it has been accidentally solved by the negroes of Old Calabar. At least, so far as the effects of their state-poison on myself went, there was no bodily uneasiness except the single attack of sickness —apparently the relics of the action of my pe-

culiar emetic—but simply a sense of sinking vitality, with clearness of mind, and without any sensation deserving in the slightest degree to be called physical distress. We know, indeed, that many forms of extreme fainting, of which this is evidently one, are attended with feelings, which if not positively pleasurable, are certainly quite unallied to pain. Death by simple fainting, without any preparatory painful process, is evidently what a humane execution should aim at producing. And all this, I apprehend, will be effected by the Calabar Ordeal-bean.

Thomas R. Fraser[1] (fig. 3), who had been Christison's assistant, continued this study, and in his graduation thesis, in 1862, discussed the action of the Calabar bean.

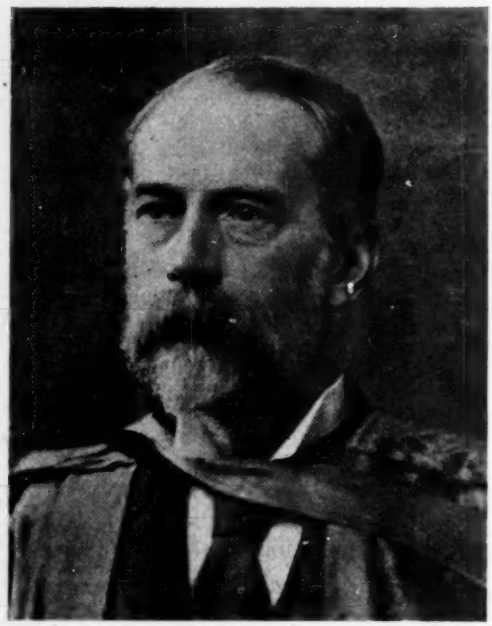


Fig. 3 (Rodin). Thomas R. Fraser, the first to isolate the active principle, physostigmine.

In 1863, he separated from the kernel (the spermoderm of the bean) and later from the excrement of a lepidopterous insect which feeds on the kernel, an amorphous active principle with the properties of a vegetable alkaloid. He proposed the name Eserina for this alkaloid derived from Esére, as the ordeal poison is called in Calabar. Some time later, he obtained a purer, crystalline form of the alkaloid, which he called Eseria.

Fraser was one of the Big Five (Sir Douglas Maclagan, Sir Thomas Grainer Stewart, Sir Alexander Simpson, Professor Greenfield) who gave greatness to medicine at the University of Edinburgh in the second half of the 19th century. All of them practiced clinical medicine and, at the same time, held chairs in a single specialty at the University. Under their leadership, the university teaching of medicine progressed to brilliant heights.

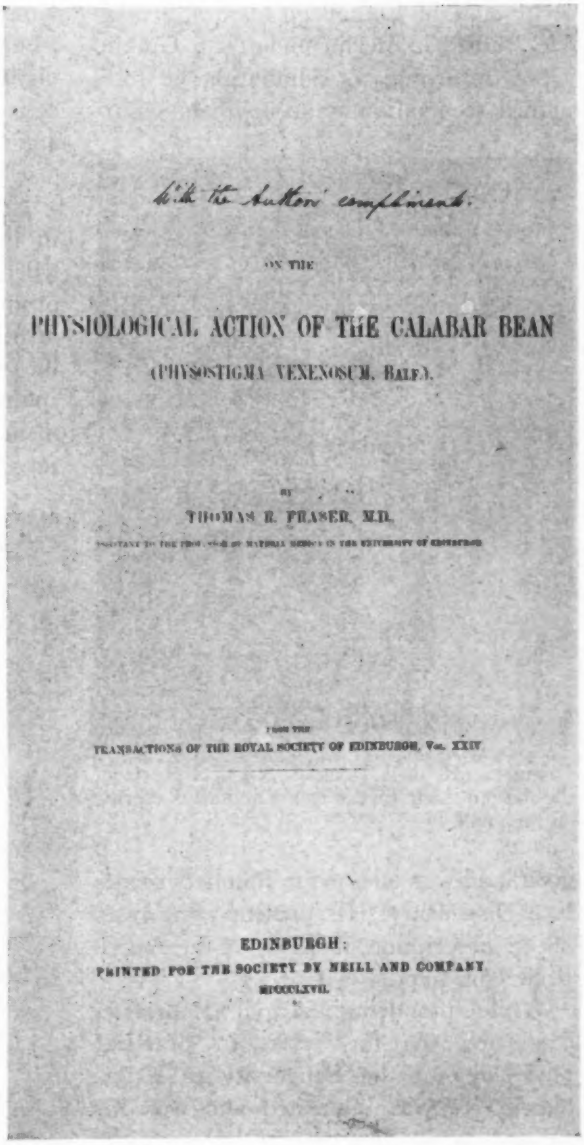
Fraser, born at Calcutta in 1841, died at 79 years of age. He was educated at the public schools in Scotland and at the University of Edinburgh, where he received a gold medal for his thesis on the Calabar bean. When Christison resigned, Fraser was appointed to his chair in pharmacology. Many honors were bestowed upon him. In 1903, he was knighted by King Edward VII.

After the publication of his work on Calabar bean, his research led to the study of other ordeal and arrow poisons. His best known contribution deals with Strophanthus and Acocanthera. Following his investigation of Calabar bean, he became interested in the subject of antagonism in general, and in that of physostigmine and atropine in particular. He regarded pharmacology as one of the means by which the healing of disease could be reached. He substituted for old methods in which the effects of drugs were studied through their administration in disease, a newer science in which, after the essential nature of the pathologic process had been defined, accurate biologic and chemical knowledge was employed to produce the substance that should influence the perverted process. This application of pharmacologic knowledge to the cure of disease, a problem entirely separate from determining the action of remedies, was illustrated by his

earliest work in connection with physostigmine, its relation to atropine, and the uses of these two drugs in ophthalmic practice.

Fraser was first to observe contraction of the pupil associated with the use of physostigmine (fig. 4). He reported that the pupil contracts within a few minutes after physostigmine is applied to the eyeball, to the cutaneous surface in its neighborhood, or to the nasal mucous membrane. He found that application of Calabar-bean extract to the eyeball produces a somewhat painful sensation of tension in the ciliary region, contraction of the pupil, myopia, and astigmatism.

Fraser described the action of physostigmine on his own eye. He placed a small drop of the syrupy solution on the conjunctiva of the left eyeball. There was instantaneous copious discharge of tears. In five minutes, the pupil of the left eye was contracted to half the size of the right. In 10 minutes, the pupil was one-sixteenth-inch in diameter. Vision became imperfect, but the eye was mobile. There was a slightly painful sensation in the supraorbital region and a feeling of heat in the left eyeball. In 30 minutes, no change was observed in the pupil of the right eye, whereas that of the left eye was pinpoint in size. Fraser noticed that vision of the left eye was greatly reduced. The eye was somewhat red and tender when exposed to light. In 1½ hours, all disagreeable sensations had disappeared, dimness of vision was less marked, but the pupil remained contracted. In four hours, vision had returned to normal, but the pupil remained contracted for 24 hours. After this it slowly dilated, and five days later had returned to normal.


With the Author's compliments.

ON THE

PHYSIOLOGICAL ACTION OF THE CALABAR BEAN

(PHYSOSTIGMA VENENOSUM, Balf.).

BY

THOMAS R. FRASER, M.D.

FROM THE

TRANSACTIONS OF THE ROYAL SOCIETY OF EDINBURGH, Vol. XXIV.

EDINBURGH:

PRINTED FOR THE SOCIETY BY NEILL AND COMPANY.

MDCCLXVII.

Fig. 4 (Rodin). Title page of Fraser's thesis, "On the Physiological Action of the Calabar Bean," reprinted from the Transactions of the Royal Society of Edinburgh.

Douglas Argyll Robertson (fig. 5), a practicing ophthalmologist, also experimented with the use of the drug and observed its action on the pupil. He was born in 1837, the son of a surgeon and

lecturer in the Edinburgh Medical School. He studied in Berlin under von Graefe. Upon returning to Edinburgh, he soon gained recognition as an ophthalmic surgeon, and was one of the founders of the Eye Dispensary. His present fame rests on his description, in 1869, of the Argyll Robertson pupil.

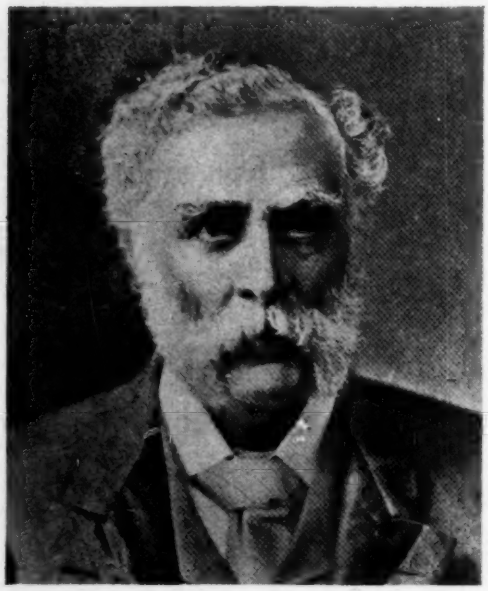
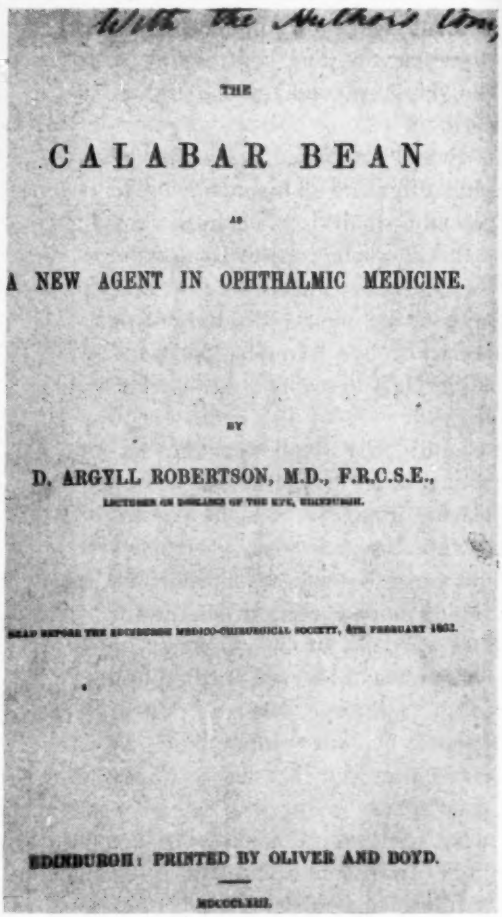


Fig. 5 (Rodin). Douglas Argyll Robertson, the first to study carefully the action of eserine on the pupil.

While practicing, Argyll Robertson conducted the first class in practical physiology at the University of Edinburgh. He was interested and well informed in all departments of medicine, and his choice of subject before the Ophthalmological Society of the United Kingdom in 1893, "Therapeutic Contributions of Ophthalmology to General Medicine," was characteristic of the man. He was appointed first assistant, then ophthalmic surgeon at the Infirmary. He was the first surgeon not residing in London to be elected president of the Ophthalmological Society of the United Kingdom.

A singularly attractive and gifted individual, he was one who would have come to the front in any walk of life. He had distinguished bearing, courage, and sincerity. As a surgeon, he was neat, rapid, and resourceful. He was also an excellent teacher.

Argyll Robertson had been interested in the discovery of a substance which, when applied to the conjunctiva, would produce an effect exactly opposite to that of belladonna; one which would stimulate the muscle of accommodation and the sphincter pupillae as atropine paralyzes them. He tried various drugs without satisfactory results. When Fraser in-



With the Author's love,

THE

CALABAR BEAN

AS

A NEW AGENT IN OPHTHALMIC MEDICINE.

BY

D. ARGYLL ROBERTSON, M.D., F.R.C.S.E.,

LECTURER ON DISEASES OF THE EYE, EDINBURGH.

READ BEFORE THE EDINBURGH MEDICO-CHIRURGICAL SOCIETY, 4TH FEBRUARY 1863.

EDINBURGH: PRINTED BY OLIVER AND BOYD.

MDCCCLXIII.

Fig. 6 (Rodin). Title page of Fraser's reprint of his article, "The Calabar Bean as a New Agent in Ophthalmic Medicine."

formed him that he had seen contraction of the pupil result from local application of Calabar-bean extract, Argyll Robertson used it on his own eyes[6] (fig. 6).

He noticed that the substance contracts the pupil and affects accommodation, causing indistinct vision of distant objects. He also observed that accommodation is first to return, before the pupil resumes normal size. Further, he instilled Calabar-bean extract followed by a drop of atropine. His experiments led him to believe that physostigmine and belladonna were antagonistic in their action on the eye.

Argyll Robertson did not realize the value of Calabar-bean extract as a miotic in glaucoma, but did suggest that it be applied after atropine preparatory to examination of the eyes. He also proposed its use for the relief of photophobia and paralysis of the ciliary muscle. Moreover, he believed it to be beneficial in cases of ulceration of the margin of the cornea leading to perforation, and even when prolapse of the iris had occurred.

Publication of the works of Fraser and Argyll Robertson incited great interest in the use of Calabar-bean extract for affections of the eye. One of the papers read at the first meeting of the American Ophthalmological Society, in 1864, by Dix of Boston, concerned the effect of Calabar-bean extract upon paralysis of accommodation following diphtheria.

Ludwig Laqueur[7] (fig. 7) was the first ophthalmologist (March, 1875) to use physostigmine therapeutically in glaucoma. He noticed that it lowered intraocular pressure temporarily or permanently.

There was strong opposition to eserine when it was first used to treat glaucoma. Laqueur maintained his stand courageously in the face of resistance. He was fortunate to have as a supporter the veteran Snellen.[8]

Laqueur mentioned that Calabar-bean extract occasionally raises intraocular pressure, but not as much as atropine. Adamük also observed a slight rise in intraocular pressure after local application of Calabar-bean extract. This finally was contradicted by Adamük, von Hippel, and Grünhagen.[9]

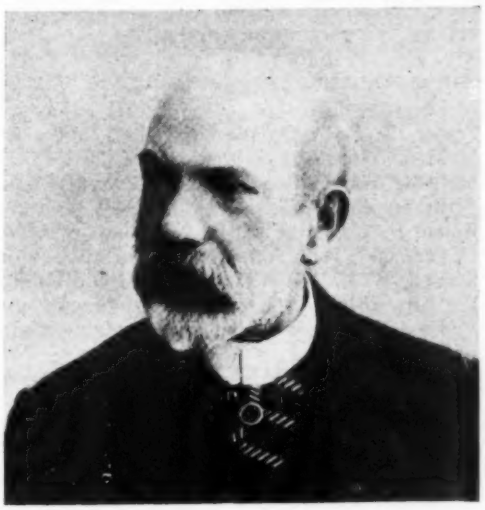


Fig. 7 (Rodin). Ludwig Laqueur, who introduced the use of eserine in glaucoma.

Laqueur used the extract in treating more than 10 cases of advanced glaucoma simplex. The effect was not identical in every case; but reduction in tension was constant. After three or four days, often at the end of 24 hours, the effect disappeared. In other cases, reduced tension was more lasting, and a cumulative effect of reduced tension to subnormal for a considerable period was obtained. He noted that improvement in vision in glaucoma simplex did not occur, but that in many cases there was increase in the visual fields. To his credit, he felt that the series of cases was too small for him to make conclusions concerning the value of the drug in glaucoma simplex. He also used physostigmine successfully in three cases of subsiding glaucoma. These were mildly subacute cases, and reacted

promptly and definitely to physostigmine over a protracted period. He reported three cases of acute glaucoma and one of possible secondary glaucoma which were benefited by the use of physostigmine.

Laqueur makes the statement that physostigmine has a favorable effect, but that it does not supplant iridectomy; it acts only as an adjunct to surgery by making the technique easier.

Von Graefe[10] also experimented with the Calabar bean, which he used to facilitate iridectomy, because the miotic effect facilitated the technique of operation.

From that time on, eserine has been used more and more extensively, and now it occupies a prominent place in the treatment of glaucoma.

490 Post Street (2).

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EVALUATION OF THE NEWER THERAPEUTIC AGENTS IN OPHTHALMOLOGY*

ELMER A. VORISEK, M.D.
Chicago

Modern civilization calls for new and better products, and medicine, to keep step, must find newer methods of therapy which produce complete cures in a shorter period of time. Chemotherapy, because of the rapidity of its therapeutic effect, certainly called attention to the fact that modern medical therapeutics is almost as spectacular as radar and the atomic bomb. Pages are being written on the experimental and clinical application and results of sulfonamide and penicillin therapy.

As a result of present day enthusiasm for things new and modern, there is a tendency to overlook the all-potent therapeutic ability of Nature to heal the ailments of the living world, and it follows that this same Nature has tremendous ophthalmo-therapeutic powers. Walter Stanley Haines, who has probably been forgotten except for his Haines solution, applied a great deal of philosophy and good common sense to his teachings, and his definition of a "good doctor," given to the young medical student, contained the admonition that a "good doctor" never did anything which would hinder Nature in her attempt to effect a cure, and he cautioned the doctor "always to consider treatment as an aid to Nature's curative powers."

For a time, it seemed that the sulfonamides and penicillin would produce a revolution in modern therapeutics, but after time and experience had mellowed the initial enthusiasm, it became quite evident that, although we were indeed more than fortunate to have these substances available to us, there were diseases which did not respond to their administration. It became necessary to evaluate these drugs properly, and to recognize, very early, those cases which would be most benefited by the use of chemotherapy. Sulfonamides and penicillin must not be used indiscriminately, particularly for minor infections. In ophthalmology, the usually accepted local therapy must still be faithfully carried out in the majority of instances.

If possible, a bacteriologic study should be made to determine whether or not the infection present is due to an organism which is susceptible to the action of these drugs. Every one realizes it is difficult to obtain a culture in the case of many external ocular infections, and, in these instances, chemotherapy will probably be instituted in spite of negative bacterial cultures.

SULFONAMIDE THERAPY

Contradictory reports on the value of the sulfonamides have been made by men of equal repute, and it is sometimes difficult to evaluate the pros and cons in the literature. Isolated case reports show miraculous cures, but some report failures. Through this dissemination of knowledge and experience, we are constantly learning more and more about the uses of the sulfonamides, and the final chapter remains to be written. Newer drugs of this group are still being discovered, and the clinical ophthalmologists, who greatly outnumber those in the research group, must be able to evaluate the information supplied in the literature, and

* Read May 20, 1946, before a special session of the Minnesota Academy of Ophthalmology and Otolaryngology at the 93d annual session of the Minnesota State Medical Association at St. Paul, Minnesota.

apply the same to everyday usefulness.

Penicillin is now frequently replacing the sulfonamides and has proved far superior in some instances. However, the ophthalmologist will still find much value in the use of sulfa both locally and orally. It appears that the sulfa ointments will replace yellow oxide in popularity. There is a tendency to use chemotherapy routinely for any infection, and, because of this tendency, some hospital records are of no value for statistical purposes. Single-dose chemotherapy, as ordinarily used, is valueless, except to impress the patient or his relatives with the fact that he has been given the latest drug which the public press is popularizing.

It must be remembered that the sulfonamides are merely bacteriostatic, and, when administered either orally or locally, they must be given in high enough doses and over a sufficient period of time to obtain not only an improvement, but a permanent cure.

Before sulfonamides are given orally, it is important that the urine and blood counts are normal and, during administration of the drug, the blood level must be maintained between 5 to 10 mg. per 100 c.c. Repeated urinalyses and blood counts must be made; alkalinity of blood and urine[1] must be maintained; high intakes of liquids are necessary; and accurate temperature recordings are required. Sunlight should be avoided to prevent possible cutaneous reactions on the basis of a photosensitization.

It behooves us to know that there are severe toxic manifestations in sensitive individuals, not only generalized but ocular as well, and toxic reactions occur after either oral administration or local application. Consequently, it is important to repeat that the sulfonamides should not be used indiscriminately for minor infections which do not warrant the risk of toxic reactions, although the recent products are less toxic than the original ones. It has been our experience that systemic and local reactions are much more frequent than one would deduce from a perusal of the ophthalmic literature.

The possible toxic reactions which may be encountered are anemia, neutropenia, cyanosis, low white count, hyperpyrexia, severe gastroenteritis, neuritis, psychosis, renal calculi, kidney damage with anuria and hematuria, and dermatoses. A sore throat may indicate a beginning agranulocytosis. Ocular manifestations of oral medication have been variously reported as optic neuritis, retinal hemorrhages, "dimness of vision," "temporary blindness," field changes, conjunctival and scleral injection, yellow discoloration of sclera, a bluish tinge indicating cyanosis or anemia of the conjunctiva, and transient myopia.

Local application of sulfonamide ointment and solution has frequently produced marked irritation of the cornea and conjunctiva with redness and swelling of the lids. It causes delay in the healing and increases the vascularization and scar formation of the denuded or injured cornea. We must also realize that, although toxic phenomena may not immediately occur, an appreciable number of patients become sensitized to the drug and display toxic effects during subsequent administration. In any case, stopping the administration of the drug usually results in rapid recovery.

If the ophthalmologist realizes all these exceedingly important factors and carefully evaluates his cases, he is prepared to proceed with sulfonamide therapy toward the goal of obtaining maximum benefits and excellent results in the majority of cases for which these drugs are so aptly suited; but, he must bear in mind that atropine, heat, surgery, and all the other specific therapeutic procedures indicated,

must be carried out in conjunction with sulfonamide therapy.

Orally, the most effective sulfonamide is sulfadiazine in average doses of 1 gm. every four hours after an initial dose of 2 to 4 gm.; and locally, sulfathiazole as a 5- to 10-percent ointment or 1- to 10-percent sodium-salt solution, and either method alone, or together, may be indicated. Several foreign authors[2] recommend a 15-percent sodium-sulfacetamide collyrium.

The ophthalmic conditions which are favorably affected are: trachoma, inclusion-body blennorrhea, catarrhal conjunctivitis, staphlococcus, gonococcus, influenza-bacillus, colon-bacillus, and actinomycosis infections, erysipelas, serpent ulcers, cellulitis of lids and orbit, dacryocystitis, endophthalmitis, panophthalmitis, and occasionally sympathetic ophthalmia.

As previously stated, penicillin is supplanting the sulfonamides in some types of infection, and especially is this true in gonorrheal ophthalmia, blepharitis, catarrhal conjunctivitis, and dacryocystitis. Nevertheless, penicillin may not be readily available; or full-strength, fresh solutions may not be practicable.

In blepharitis we have had the best results by rubbing the sulfathiazole ointment into the roots of the lashes. It usually acts most rapidly but, unless continued for sufficient periods of time, recurrences result. If recurrences do occur, staphylococcus toxoid used in conjunction with the sulfa ointment produces excellent results. If trichiasis should be present, the lashes must be epilated; and if the meibomian glands are involved, they must be mechanically expressed. Nor will sulfathiazole used locally cure a chalazian or hordeolum. In the presence of secretions or debris, the bacteriostatic action is inhibited.

The preponderance of evidence indicates that the sulfonamides are curative or of great value in the treatment of trachoma, but there are a few leading authorities who believe that these drugs are ineffective.[3] However, the sulfonamides, orally and locally, must be included in the treatment of trachoma,[4-5] and other types of therapy will still be indicated in those cases in which sulfa therapy either fails to act or where a sensitivity to the drug exists.

In the case of inclusion-body blennorrhea, irrigation with a sodium-sulfathiazole solution every two hours, sulfa ointment at night, and sulfadiazine by mouth, produce excellent and very rapid improvement within seven to ten days as compared to six weeks with the previous types of therapy.

Similarly, the prolonged severe inflammation, with poor response to previous types of therapy which was encountered in the cases of membranous conjunctivitis, has been eliminated by the local use of the sulfonamides.

Catarrhal conjunctivitis responds very rapidly to the local use of the sulfa—both ointment and solution—but, in the presence of purulent discharges or anesthetics, the action is inhibited.

Excellent results are obtained in ulceration of the cornea, but here, as well as in traumatic destruction of the epithelium, results are obtained only when superimposed infection exists. The sulfonamides delay the healing of corneal ulcers[6] and produce an increase in the amount of scar formation in a denuded or injured cornea and should not be used except in the presence of a superimposed infection.

It was most interesting to analyze the statistics of Smith[7] of the Royal Hospital, Sheffield, in reference to hypopyon ulcers, for the years 1936 through 1944. The admission of patients with spontaneous ulcers averaged 24 per year, and those with traumatic ulcers 53 per year—39 with hypopyon and 14 less severe. Py-

rexial and local treatment remained essentially the same during this nine-year period, but in July, 1939, the treatment was combined with the internal administration of sulfanilamide, changing to other sulfonamides as these became popular. The average number of days hospitalization for the period 1936 through 1939 was: hypopyon ulcer, 19.6 days, and less severe ulcers, 13.0 days. Then there occurred a definite decrease in necessary hospitalization with the average in 1944 being: hypopyon ulcer, 12.5 days, and less severe ulcers, 7.5 days.

Since a high concentration of these drugs appears essential to an effective therapeutic result, the local use seems to be preferred over the systemic use. In cases of inclusion blennorrhea, trachoma, and serpent ulcer, however, it has been proved that both oral and local administrations are required. There does occur some penetration of these drugs into the anterior chamber, but to induce this penetration it is necessary to utilize heat, paracentesis, wetting agents, and so forth.

In cases of cellulitis of the lids and orbit, endophthalmitis, and panophthalmitis, excellent results have been obtained through oral administration of large doses. However, the administration must be started very early, and continued for several days after complete recovery has occurred; and then, gradual reduction, rather than abrupt cessation of the drug, is to be preferred. If abscess formation occurs, it is absolutely necessary to incise and drain; otherwise, the suppurative material will not be absorbed.

Since the sulfonamides have been used so extensively for the treatment of meningococcic meningitis and scarlet fever, there has resulted a marked decrease in the number and severity of the complications. We are now aware of one to two cases per year of endophthalmitis as compared with eight to ten such complications only a few years ago. The same decrease in incidence applies to orbital abscesses and acute suppurative dacryocystitis. Sulfonamides not only cure the systemic infection swifty but, in so doing, also prevent the serious complications. It is recalled that in several cases of complications, sulfa was not administered immediately but was withheld, pending diagnosis. This situation brings up the point that possibly, in these cases, the complications had already begun before the sulfonamide blood level was of sufficient concentration to control the bacterial activity. A reduction in the number of complications has also been noted in other instances besides ophthalmic; for example, the decrease in the incidence of mastoiditis, following middle-ear infections. We are prompted to repeat again, that in order to obtain satisfactory results, sulfonamide therapy must be begun early, given in high enough doses, and for a sufficient length of time.

Gamble[8] reported the successful control of a case of sympathetic ophthalmia with sulfa, and since then he has had similar experiences with several other cases. I have had the privilege of following two of these cases. The most recent one, which is of about five months' duration and which is still under observation, develops periodic episodes of mild ciliary injection, without cells in the anterior chamber. In this case, an extensive dermatosis with hyperpyrexia developed, with immediate recovery when the drug was discontinued. This case will be referred to later.

Several other cases have been reported[9] with control of the sympathetic ophthalmia, but some cases have also been reported as failures. Nevertheless, in this most dreadful of ophthalmic afflictions, sulfathiazole should be administered as soon as possible and in large doses.

There is a consensus of opinion that

sulfa is very beneficial as a prophylactic after intraocular injuries or after operations with threatened infection. Our experience would confirm this opinion, and no postoperative infections have occurred during the routine use of 5-percent sulfathiazole ointment, locally, or oral administration of sulfathiazole when indicated.

We have found the sulfonamides of little, if any, value in uveitis. An occasional report has been made purporting to have produced good results, but a perusal of the case reports leads us to be skeptical of the published conclusions. Many cases of uveitis regress under conservative treatment; whereas, others terminate unfortunately in spite of everything one may do. One has only to consider the vast number of quiescent lesions which are seen on routine ophthalmoscopic examination to appreciate that many cases of both anterior and posterior uveitis recover without any treatment, and without apparent knowledge of their existence by the patient. This is especially true of choroiditis.

In 1942, Levy and Lewis[10] reported the successful use of the sulfonamides in 137 cases of gonorrheal conjunctivitis, and advocated both systemic and local applications, because results with local therapy alone did not compare favorably with the internal use of the drug. Successful reports[11,12,29] have also been published in relation to ophthalmia neonatorum, but in both of these instances we believe that the sulfonamides will be completely eclipsed by the miraculous results of penicillin therapy. There seems to be no justification in subjecting a two-weeks-old baby to oral sulfonamide.

Penicillin

Whereas the sulfonamides are merely bacteriostatic, penicillin actually kills organisms, and it is probably because of this ability that the latter is gradually replacing the former in ocular therapeutics.

Penicillin may be administered systemically or locally or both, and is also used locally in conjunction with the oral administration of the sulfonamides. Like the sulfonamides, penicillin can be administered intramuscularly or intravenously, but it cannot be given orally in simple solution because the acid gastric juice destroys its action. When applied locally, any acid substance like boric acid or the adrenalin hydrochloride[13] will inhibit the action of penicillin. It cannot be regarded as a nontoxic substance or a readily diffusible one.

Last April a report[14] was published describing the oral use of penicillin in conjunction with aluminum dihydroxyamino acetate. Eleven cases of external disease and four cases of uveitis were reported. Rapid cures were obtained in the majority of cases, but three cases of external infections and the four cases of uveitis failed to respond.

Generally speaking, Gram-positive organisms are sensitive, and Gram-negative ones are insensitive; staphylococcus aureus, streptococcus pyogenes, the gonococcus, and the meningococcus are sensitive; the pneumococcus is only moderately or slightly sensitive, according to type; the hemophilic group is relatively insensitive, but all insensitive organisms seem to respond to very strong concentrations of penicillin; and the sensitivity varies widely with different strains of the same organism. Acquired resistance frequently occurs. The only incompatability is the acid radical; and, very fortunately, the common ophthalmic drugs—atropine, eserine, cocaine, argyrol, fluorescein, and so forth —can be used in conjunction with penicillin.

Penicillin has no effect on body tissues; there is no inhibiting effect on leukocytes; it is less lethal than the sulfonamides; secretion and debris do not inhibit its ac-

tivity; on the other hand, it seems that the more pus and organisms present, the more striking is the effect of the penicillin.

Toxic manifestations,[15] local and systemic, are encountered in the use of penicillin, and have been variously reported as chills, fever, headaches, eosinophilia, urticaria, thrombophlebitis, gastrointestinal reactions, serum sickness[16] of varying degree, contact, vesicular, and bullous dermatitis, swelling of the conjunctiva and eyelids.[17] However, these reactions are not as frequent nor as severe as those associated with the use of the sulfonamides, and promptly disappear when the administration of the drug is discontinued.

In cases of episcleritis, phlyctenular keratitis, marginal ulcerations, herpetic keratitis, and corneal ulcerations in general, penicillin has no value unless there is an associated infection with a susceptible organism. It is not too effective when administered intramuscularly in the case of deep ocular infections due to the difficulty in obtaining sufficient concentration in the ocular tissues, and to the inability of the penicillin to penetrate into the intraocular spaces. It is best used early before deep infections occur but, with the advance of time, intraocular injections will become feasible.

Very recently, Stokes and others,[18] after a very exhaustive study of the use of penicillin injections for neurosyphilis, stated that "the results in primary optic atrophy are as yet inconclusive."

When used locally, penicillin must be kept in constant contact with the tissues either by way of the ointment, frequent instillations of the aqueous solution, continued corneal baths, or by iontophoresis.

It has been used as a subconjunctival and anterior-chamber injection, with good results if a pure solution was used, but it should be injected in small quantities. Injection into the vitreous of a very pure solution has been advocated with caution.

Penicillin has little, if any, value in choroiditis of unknown etiology, and one must question the few reports which attempt to show that results have been obtained.

Recently, Ida Mann[19] reported the intraocular use of penicillin in 29 cases of severe infection following injury. Only those cases were chosen in which, from general clinical experience, the prognosis was considered to be hopeless; namely, unless enucleation was performed the pathologic process was expected to continue indefinitely. In these cases, 0.25 c.c. of a solution of 1,000 to 50,000 units was injected into the anterior chamber or vitreous; penicillin ointment was applied locally. The weaker dilutions seemed to give the best results, and the stronger solutions were used only in the most desperate cases. The prognosis was worse, if the lens had been injured. Where the penicillin came in direct contact with the vitreous, the vitreous became opaque, and sight was not regained. In all cases which recovered, there occurred a reactive iritis lasting four days but subsiding suddenly. Apparently, only two injections were necessary, and in all cases where a third injection was deemed necessary, the eyes remained blind.

Of these 29 cases, 11 eyes did not improve and were enucleated. Of the remaining 18 eyes, nine healed and remained quiet and painless, but blind from damage done by the original injury. In three of these, the injection was made into the vitreous, which became opaque and did not clear; one healed with cataract formation; one regained 6/200 vision; one regained 20/100 vision; and the remaining six healed with good results.

In the experimental work on rabbit eyes, which preceded this clinical trial, penicillin injected into the anterior chamber produced a reactive, aseptic, anterior uveitis of varying severity, with 100 per-

cent pure solution producing a minimal reaction. When injected into the vitreous, it produced a most complete neuroretinal degeneration followed by fibrosis, and accompanied by thickening and fibrosis of the choroid. Again, pure penicillin showed minimal and transitory effects, or none at all.

It appears, therefore, that intraocular injections of penicillin, while at present subject to great caution, may ultimately prove of tremendous value in combating intraocular infections. When used locally after operations, or at once in penetrating injuries, penicillin prevents the incurrence of infection, and will readily disinfect the conjunctival sac prior to ocular surgery.

It is important that solutions for topical application be frequently and carefully prepared, and properly refrigerated. It must be frequently applied to maintain concentration. The ointment, 1,000 Oxford units per gram, is admirable because the penicillin retains its activity in high concentration for a longer period of time. As in the case of the sulfonamides, penicillin must be continued for at least 48 hours or more after apparent clinical cure to prevent a relapse.

With the apparatus of MacMillan of the physiotherapy department of the Royal Victoria Hospital, Montreal, iontophoresis[20] produces the quickest and most effective penetration of penicillin into the anterior chamber of the eye, and is followed by excellent results in bacterial infections of the anterior segment. However, the apparatus is not readily available, and the technique requires considerable care and attention. A continuous corneal bath or a continuous drip method while the patient is awake, or the method of Wright,[21] where a pipette is inserted under the inner end of the upper lid while the patient is asleep, are excellent and more simple methods to employ. The subconjunctival injection of penicillin will also result in a penetration of the drug into the anterior chamber. In addition, edema or inflammation of the cornea, cocainization of the cornea, or damage to the corneal epithelium will increase the rate and amount of penetration.[22–25]

Very little has been written about penicillin control of sympathetic ophthalmia.[24] Gamble[26] gave his patient, previously mentioned here, large doses of penicillin after he became toxic to the sulfonamides, and five months after the onset of sympathetic symptoms, with no penicillin for the past four months, no cells have been noted in the anterior chamber, and the vision remains normal, although several attacks of ciliary irritation have occurred.

Another case, which I believe responded to penicillin, suffered a laceration of the eyeball with a safety razor blade. Apparently, because of continuous inflammatory reaction for six weeks after injury, an enucleation was performed. Four days later the patient came under my observation. Intuition prompted a daily slitlamp examination. Only an occasional cell was noted in the anterior chamber, but within the next four days the cells increased in such numbers that sulfathiazole was promptly administered. The same evening the patient had severe hyperpyrexia with a rash and acute gastroenteritis. The sulfa was immediately discontinued—followed by prompt relief of the toxic symptoms. The following day the cells increased in number. The patient was given 30,000 units of penicillin intramuscularly every three hours around the clock. The cells in the anterior chamber became very numerous and large deposits formed on the posterior surface of the cornea. Within five days after penicillin therapy was instituted, the cells began to diminish, the deposits gradually decreased in size and number and, after 15 days, no further activity was noted, ophthalmoscopic examination was entirely

negative, and the vision was normal. The penicillin was administered for a total of 21 days. The patient was observed for about two months, was examined one year later, and continued to be free of all symptoms with no recurrences. It would appear that penicillin certainly merits a trial in similar instances. It should be noted that the penicillin was started very early. I might add that the daily slitlamp examinations revealed the activity, prior to any subjective or other objective symptoms, and these were minimal even after they did occur, possibly because of the concurrent penicillin injections.

The clinical evidence for the use of penicillin is overwhelmingly in favor of its local application to the lids and to the conjunctival sac. It is specific for almost all types of infectious conjunctivitis and blepharitis, which respond best to the ointment.

In ophthalmia neonatorum and gonorrheal ophthalmia,[30] penicillin acts miraculously in aqueous solution, being advocated in strengths of 200 to 1,000 units per c.c., applied locally. The British[27] had suggested its use locally. In 1943, we[28] saw a most terrific discharging gonococcic ophthalmia of two weeks' duration. Since penicillin was not readily available to us at the time, we drained the bottoms of several vials and made up a saline solution of 500 units per c.c. and instilled it hourly. When a clinical cure was obtained in 24 hours, it was believed that the solution was too strong, and it was reduced to 250 units per c.c. Our later experience indicated that either 500 or 1,000 units per c.c., made up fresh every few days and kept properly refrigerated, is the solution of choice, with a complete cure to be expected in one or two days.

Sorsby[24] advocates the use in infants of one drop at intervals of one minute for a half hour. He says that drops every hour are good, but every five minutes, better.

When a genital gonorrhea coëxists, the intramuscular injections[29] will also control the ocular infection; nevertheless, we believe that, in addition, a solution of penicillin should also be instilled locally. However, when there is no other lesion present, except in the conjunctiva, local instillations will suffice, and, under these circumstances, intramuscular injections are not indicated unless the local treatment should happen to fail.

The specificity of penicillin for the gonococcus also brings up the question of a substitute for the present recognized form of Credé prophylaxis, and it is possible that, in the near future, either penicillin solution or ointment may be found more efficacious and less irritating than 1-percent silver nitrate.

We advocate[17] the use of the weaker solution for irrigation of the lacrimal sac in instances of acute suppurative dacryocystitis, and we have found that it will prevent infection when used as irrigation through the puncta after dacryocystorhinostomy.

It must be remembered that in cases of orbital cellulitis, where an abscess develops and presents a fluctuating localization, penicillin injections alone are not sufficient. Proper incision and drainage are absolutely essential, after which penicillin packs or frequent local irrigations through the surgical incision, in addition to the injections, result in rapid recovery.[17]

In considering the value of penicillin in ocular therapy, one is aware of an absence of agreement among observers, and discrepancies are reported in the clinical results obtained, but these are probably due to impurities of the products available. As our knowledge of penicillin grows, and when a really pure product

is produced or an effective synthetic product is developed, we can anticipate more certain results and possibly even more rapid and spectacular cures.

This statement can be supplemented by quoting a report by the United States Public Health Service and National Institute of Health:[31]

"Penicillin, as commercially prepared, contained not one but several penicillins, known as G, X, F, and K. Penicillin K has been shown to be of little or no value in syphilis and in certain other infections because, as compared with other penicillins, it is rapidly destroyed in the body. The relative effectiveness of the other penicillins G, X, F has not yet been determined for syphilis or for other infections. . . . The situation as to penicillin is a complicated scientific problem under co-operative study both in laboratories and in clinics."

Recapitulating this discussion we can say that: (1) penicillin is the most effective therapeutic agent for acute superficial bacterial infections of the eye; (2) it has great value as a prophylactic before surgery or after injuries; (3) it is indicated in nonbacterial infections only if secondary bacterial infection is present or threatened; (4) in intraocular infections bacterial in origin, it must be used in frequent and continuous intramuscular injections of high concentration in conjunction with high local concentration.

The Hypertherm

There is nothing new about heat treatment, this form of energy having had therapeutic application since the early days of human existence. Foreign-protein injections, intravenous, subcutaneous, and intramuscularly, may produce fever, and they have been used by everyone in many cases, but here also there are limitations to their application.

Hyperpyrexia has now been modernized in the form of the feverbox or hypertherm; it has been popularized and used extensively in other branches of medicine, and a few ophthalmologists have been sufficiently interested to publish their results with this method.[33,34,35] The hypertherm was used in a series of 14 cases in which there were pathologic conditions present in 18 eyes. These were not usual nor routine cases. They were cases of a more or less serious nature in which either typhoid vaccine, intravenously, was believed contraindicated, or in which its use had proved unsatisfactory or dangerous because of unfavorable reactions. Other types of injection might have been tried, but the pathologic process was too active to warrant taking a chance with any type of therapy which would show results only after a prolonged period of administration. Except for the usual local treatment, which was carried out in each case, there was nothing else which could be used to stem the active pathologic process. The sulfonamides were disregarded because our previous experience with their use in similar cases was very discouraging.

The ability to keep the body temperature at a desired level, for a specific length of time, is a distinct advantage, and it is believed that these factors play an important role in the therapeutic successes obtained. Except for the discomfort of the treatment itself, there were no unfavorable reactions, either local or systemic. Without exception, those patients who were suffering pain voluntarily stated that the pain disappeared during the fever session. All the usual local treatments such as fomentations, atropine, dionin, and so forth, were continued either during or between sessions.

Stated briefly, patients must be prepared for the hypertherm treatments psychologically and physically.[32] The heart,

kidneys, blood, and chest must be relatively normal. The afternoon before the treatment, salt must be given orally and intravenously, plus a cleansing enema; a mild sedative is given both the night before and the next morning, one hour before entering the feverbox. During sessions, the specific gravity of the blood is determined and saline is administered by mouth and intravenously.

The temperature of the treatments varied between 102.5 and 105 degrees. Although Smith[33] recommends 105 degrees for a two-hour period and Knight[34] advises 105 degrees for a five-hour period, our observations indicated that better clinical results and better coöperation resulted from a moderate 103-degree fever sustained for a period of four to five hours. It should be stated that it requires from one to two hours to raise the patient's temperature gradually to the desired level. It is during these two hours that the patient is most apprehensive and requires the greatest amount of attention. In our series the fever sessions were repeated every two to five days; two patients receiving 5 treatments each, and two patients receiving 12 treatments each, with an average of 9 treatments per patient. The length, frequency, and severity of the treatment depended upon the pathologic condition present and upon the ability of the patients to withstand the treatment. This entire procedure should be under the supervision of a physician physiotherapist with whom there must be mutual coöperation. I am sure that the success we have had was in no small part due to the genuine interest and coöperation of my colleague, Dr. L. S. Shensa.

The pathologic conditions present in the 18 eyes were classified as: choroiditis, 5; iridocyclitis, 5; uveitis, 4; corneal abscess, 2; and severe interstitial keratitis, 2 eyes, both in the same patient with a positive Kahn reaction but no other evidence of congenital syphilis. The visual results were excellent in 8; good in 4; fair in 3; and poor in 3.

A therapeutic success occurred in all the cases. The pathologic activity ceased, and no further local or systemic treatments were necessary except in the case of a colored patient with bilateral sarcoid uveitis who regained fair vision with marked reduction in the pathologic activity but who, later, suffered a recurrence of the uveitis. The hypertherm treatments were not repeated because we believed that the patient could not tolerate them. The three eyes in which poor vision resulted included one with uveitis and two with corneal abscess. Each of these abscesses involved three fourths of the cornea and, because of imminent perforation in both cases, paracentesis was performed, and the corneal section was opened twice on successive days.

We must consider the possibilities of future recurrences in some of these cases; nevertheless, without this type of therapy, it seems certain that the pathologic activity in these eyes would have continued indefinitely and would have resulted in an enucleation in at least some of the cases; and, certainly, blindness would have resulted in many of the 13 remaining eyes.

Ophthalmologists have given the hypertherm scant attention and, in general, are not aware of the usefulness of this very valuable adjunct to their therapeutic armamentarium. It is, therefore, my desire to bring this form of therapy to your attention and to urge its more frequent use in specific cases.

In conclusion, I would like to state that before long, much that we have said may become obsolete—new drugs and new methods of application will be developed. It was not my desire to give a complete review of the subject, but rather to present a general review of the situation, and to encourage an impartial interpretation

of the information which is being published. Chemotherapy and the hypertherm offer excellent and successful results in certain types of ocular conditions, and they are worthy of a trial in many others.

Therapeutic success depends upon the doctor's ability to analyze each individual case and to decide, quickly and accurately, which form of therapy will achieve the best results, with relief from suffering and with preservation of vision.

30 North Michigan Avenue (2).

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INFLUENCE OF PENICILLIN ON THE COURSE OF OCULAR LESIONS DUE TO A TOXIC AGENT*

IRVING H. LEOPOLD, M.D., AND WILLIAM O. LAMOTTE, JR., M.D.
Philadelphia

Penicillin has been shown experimentally[1,2] and clinically[3,4] to be an effective local agent in the treatment of corneal infections due to penicillin-susceptible organisms. However, there is little reported evidence in the open literature of the value of local penicillin in the prevention of secondary infection in corneal lesions due to toxic agents. It, therefore, seemed advisable to present some data on the course of an experimental standardized ocular lesion, due to vesicant agents, that was treated with penicillin.

METHOD

Six rabbits were used, and organisms from the corneal surface of both eyes of each rabbit were removed with a platinum loop for culture 24 hours before and immediately after burning.† Free-base‡ HN_2 (0.4 mg.) was applied to the superior limbus of each eye from a McMasters microsyringe,[5] and the lids allowed to close immediately after the application had been made. Each eye was read daily and numerically evaluated by a method previously described.[6]

Twenty-four hours after burning, material for cultures was again taken from the corneal surface, following which penicillin, in dosage of five drops of a solution containing 250 units per c.c., was applied to the right eye, and sterile normal saline, in similar quantity, was applied to the left eye of each rabbit. Such therapy was repeated at 9, 11, 1, 3, 5, and 7 o'clock each day. Cultures were taken of the treated and control eyes every day at 8:45 a.m., so that there was a lull in therapy for 13 hours prior to culturing.

TABLE 1

ONSET OF CORNEAL VASCULARIZATION

	8	9	10	11	12	13	14	15 Days
Treated eyes .....O.D	**2**		1		1	1		1
Controls .....O.S	5	1						

These eyes were read daily for 21 days. At the end of this time, photographs were taken, and the eyes were enucleated, prepared by celloidin technique, and stained with hemotoxylin and eosin. All eyes were marked so that sections were cut through the most severely involved area of each cornea. Microphotographs were taken of that portion of each corneal section which demonstrated the most histologic change.

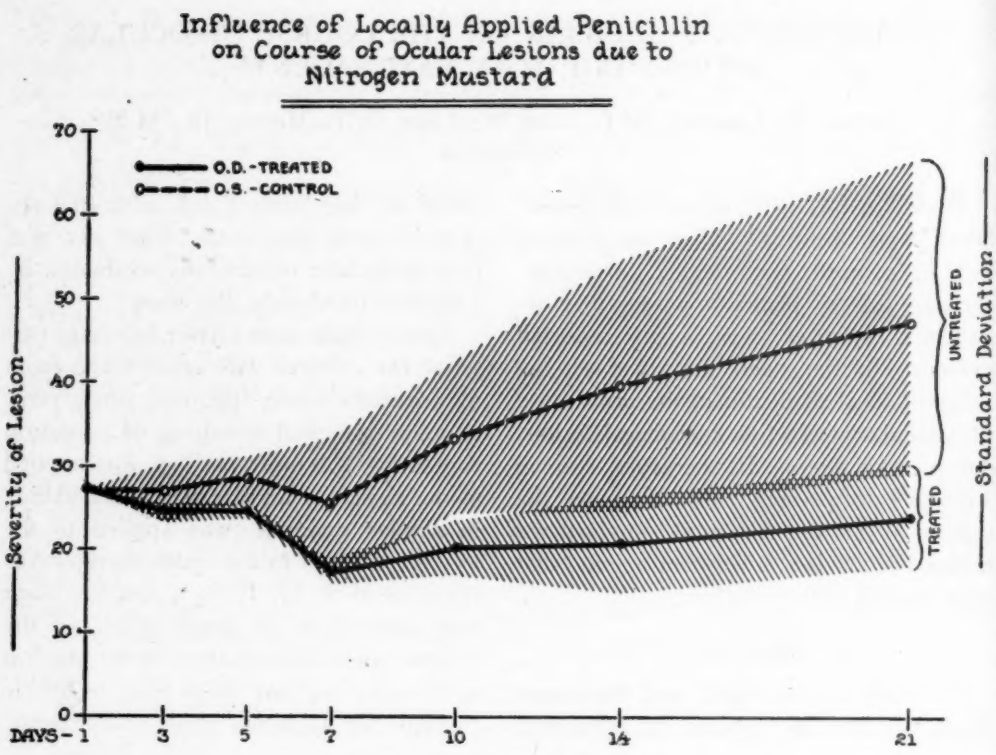
CLINICAL RESULTS

Clinically, all the eyes treated with penicillin solution showed decidedly less conjunctival discharge, edema, and injection than the control eyes. Four of the

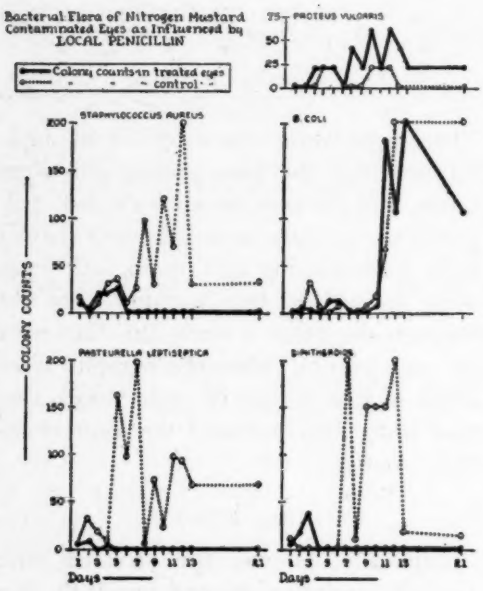
* From the Department of Ophthalmology of the University of Pennsylvania Hospital. The work described in this paper was done under a contract, recommended by the Committee on Medical Research, between the Office of Scientific Research and Development and the University of Pennsylvania.

† Cultures were first run on blood-agar plates, aerobically and anaerobically. Differentiation media were used as required. All plates were read at 24- and 48-hour intervals after culturing.

‡ HN_2—a symbol representing a nitrogen mustard (dichlordiethyl ethylamine).



Graph 1 (Leopold and LaMotte)



Graph 2 (Leopold and LaMotte)

six treated eyes showed slightly less corneal edema when examined with a biomicroscope and compared to the control. The onset of corneal vascularization was significantly delayed in the treated eyes as is seen in Table 1.

No significant difference could be noted in the rate of corneal epithelial regeneration. By the end of the 21-day period, there was a well-defined inequality in the severity of the total lesion between the treated and the untreated eyes of four rabbits. In two rabbits, the contrast was not significantly evident. When the clinical evaluations are compared through mean and standard deviations and plotted graphically, it is evident that a wide separation of the mean values occurs, but the standard deviations do not quite separate (graph 1).

BACTERIOLOGIC RESULTS

The organisms found were staphylococcus aureus, proteus vulgaris, diphtheroids, bacteria coli, pasteurella leptiseptica, an occasional beta-hemolytic streptococcus, neisseria sicca, and neisseria flava. Several observations were fairly evident after a study of the daily colony counts of each organism. It was noted that the nitrogen mustard did not have a significant bactericidal effect on the organisms. Only staphylococcus aureus showed a slight decrease in incidence in the 24 hours after burning. The diphtheroids and the pasteurella organisms actually increased in number (graph 2). It was also evident that the growth of organisms, as in mustard ocular lesions, gradually increased and reached a maximum by the end of the first 7 to 10 days after burning. Graph 2 also demonstrates the striking influence of locally applied penicillin on the bacterial contamination of the conjunctival cul-de-sac following nitrogen-mustard burns. In the case of three organisms sensitive to penicillin, the penicillin-treated eyes no longer showed these organisms after three to four days of local therapy. This can easily be seen by examining Graph 2 with particular ref-

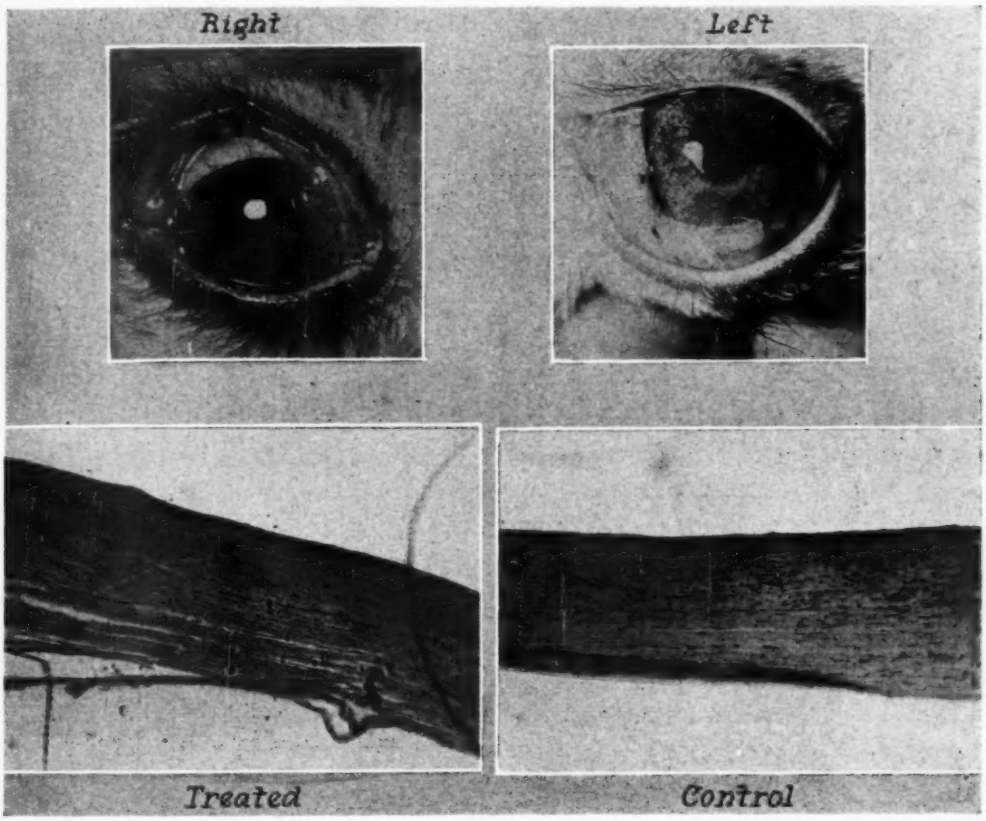


Fig. 1 (Leopold and LaMotte). Clinically the treated right eye shows a clear cornea while the control cornea shows definite haze of lower third. Histologically the control cornea shows slightly greater cellular infiltration.

erence to the staphylococcus aureus, the pasteurella leptiseptica, and the diphtheroids; whereas, the organisms not sensitive to penicillin—such as proteus described.[7, 8, 9] The eyes of this series do not differ from those previously described except in two details: (1) The treated eyes of four rabbits showed significantly

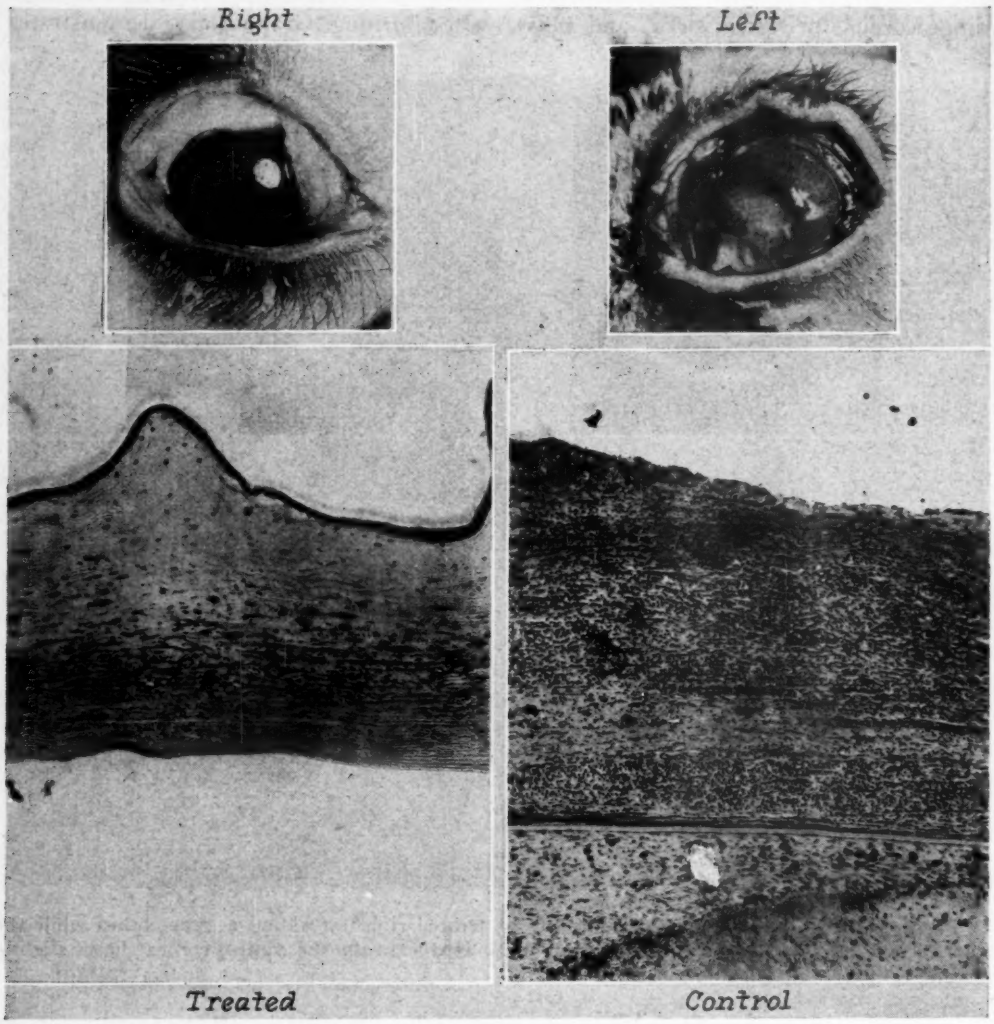


Fig. 2 (Leopold and LaMotte). The left cornea shows greater opacification, vascularization, cellular infiltration, and edema than the treated right cornea.

vulgaris and bacteria coli—continued to flourish in spite of therapy.

HISTOLOGIC RESULTS

The histologic course of a severe nitrogen-mustard burn has been adequately

less inflammatory cell infiltration of the corneal stroma than the untreated eyes. (2) Less corneal edema occurred in the treated eyes of the same four rabbits.

There was less inflammatory cell invasion of the anterior chamber in the

treated eyes of three rabbits, but this was not as striking as the reduction of corneal cellular infiltration.

corneal section showing the most histologic change. It is evident that in four rabbits the control cornea shows more

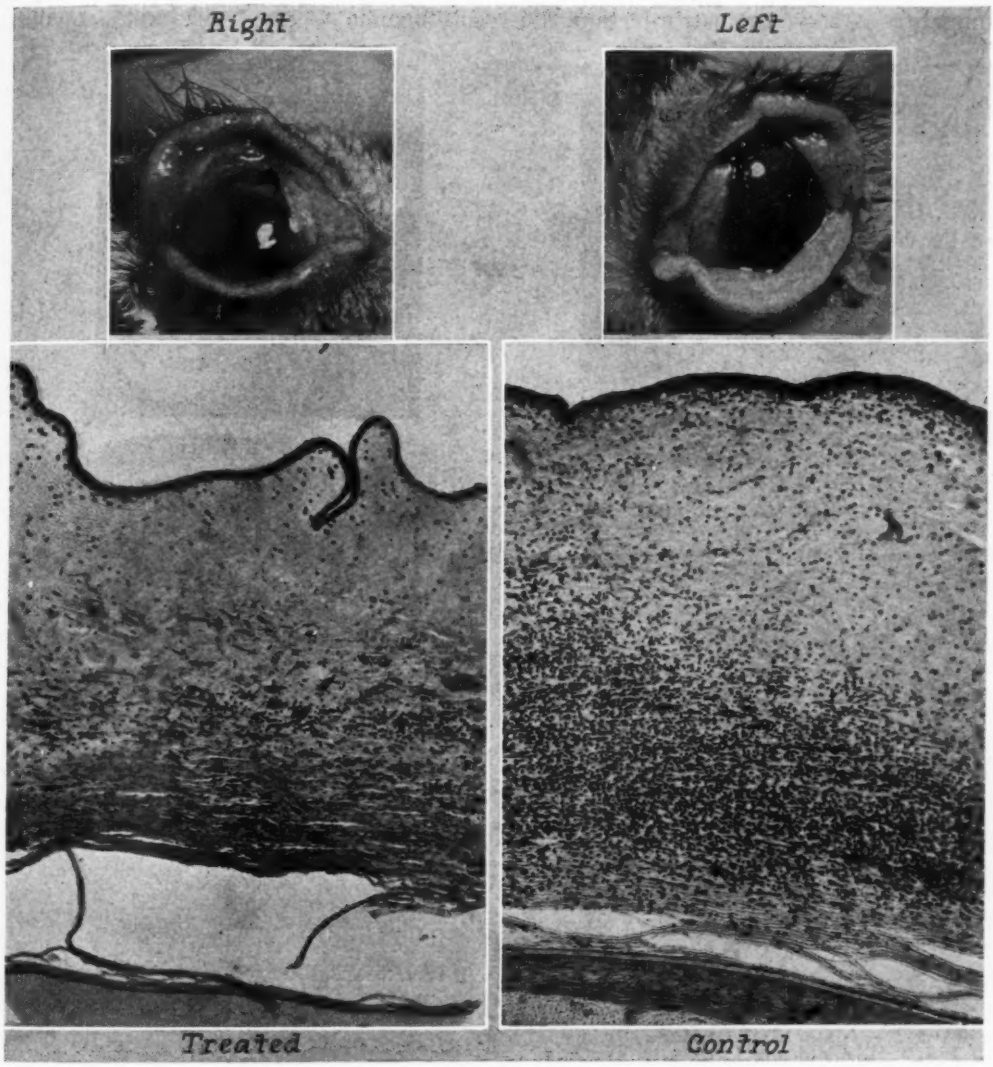


Fig. 3 (Leopold and LaMotte). The treated cornea shows decidedly less edema and cellular infiltration than the control but still shows considerable disturbance of the normal corneal structure.

The accompanying photographs show the treated and untreated eyes of all six rabbits after 21 days. The corneal microphotographs were taken at a magnification of 150× through the portion of the

cellular infiltration and detritus than the treated cornea.

Discussion

It is evident from these data that local penicillin therapy has a beneficial influ-

ence on the course of ocular burns due to liquid free-base nitrogen mustard. It is also fair to assume that, if all organisms had been sensitive to penicillin and, if animal resistance against infection did not vary from animal to animal, the effect would have been even more striking. It is not necessary to point out that such treatment does not cure a severe splash-and-blink burn but simply decreases its intensity.

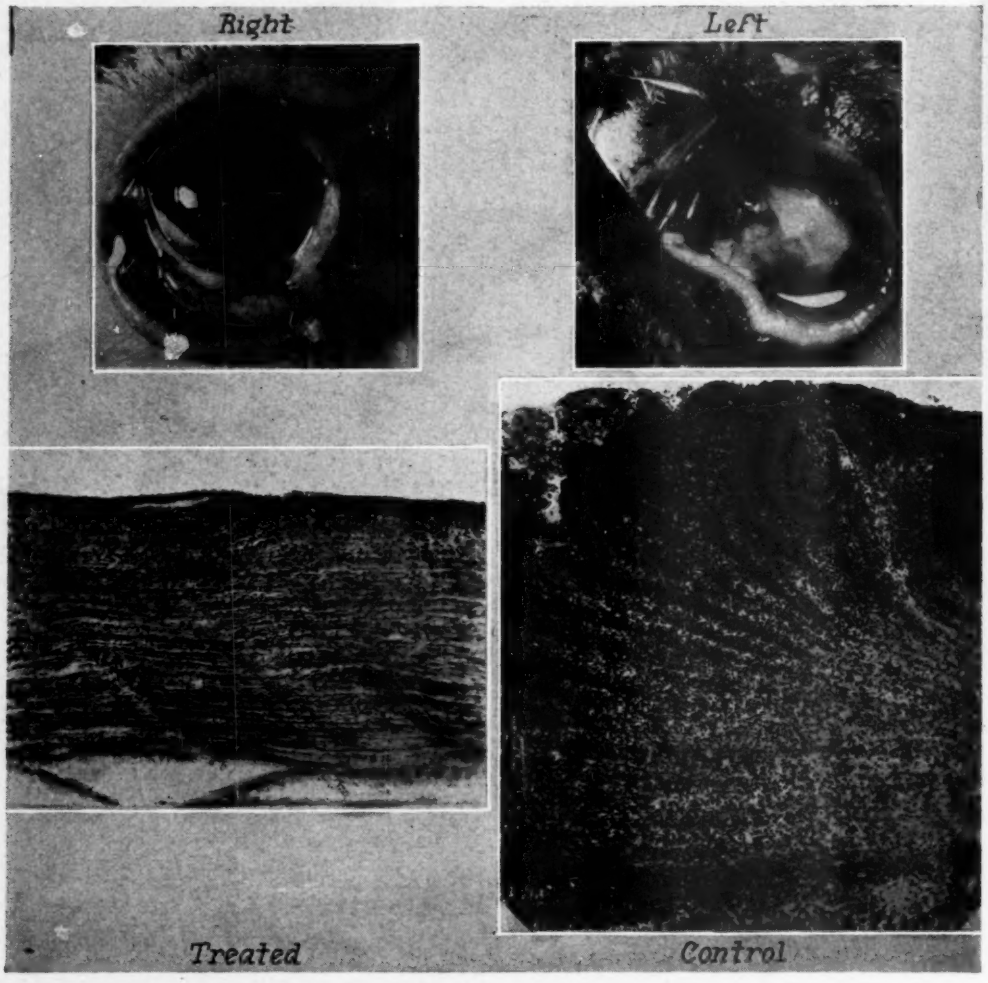


Fig. 4 (Leopold and LaMotte). The left cornea has almost perforated and the cellular infiltration is massive. The right eye shows decidedly less edema. Although the infiltration is less than in the control cornea, it is still marked.

The significance of secondary infection in ocular burns due to mustard gas, and the influence of chemotherapeutic agents on the course of such lesions has been studied.[10, 11] The data indicate that local sulfonamide therapy and local penicillin therapy, even more so, will reduce conjunctival discharge, bacterial flora, resulting lid deformities, delay the onset of corneal vascularization and, to a small degree, even reduce the amount of corneal edema. Histologic evidence of secondary infection has been demonstrated by

Hughes[12] to occur in lewisite-burned corneas and by Scholz[13] to occur in nitrogen-mustard-burned corneas. Considerable evidence has thus accumulated that demonstrates the value of anti-infectious agents for the prevention of secondary infection in corneas previously damaged by a toxic chemical.

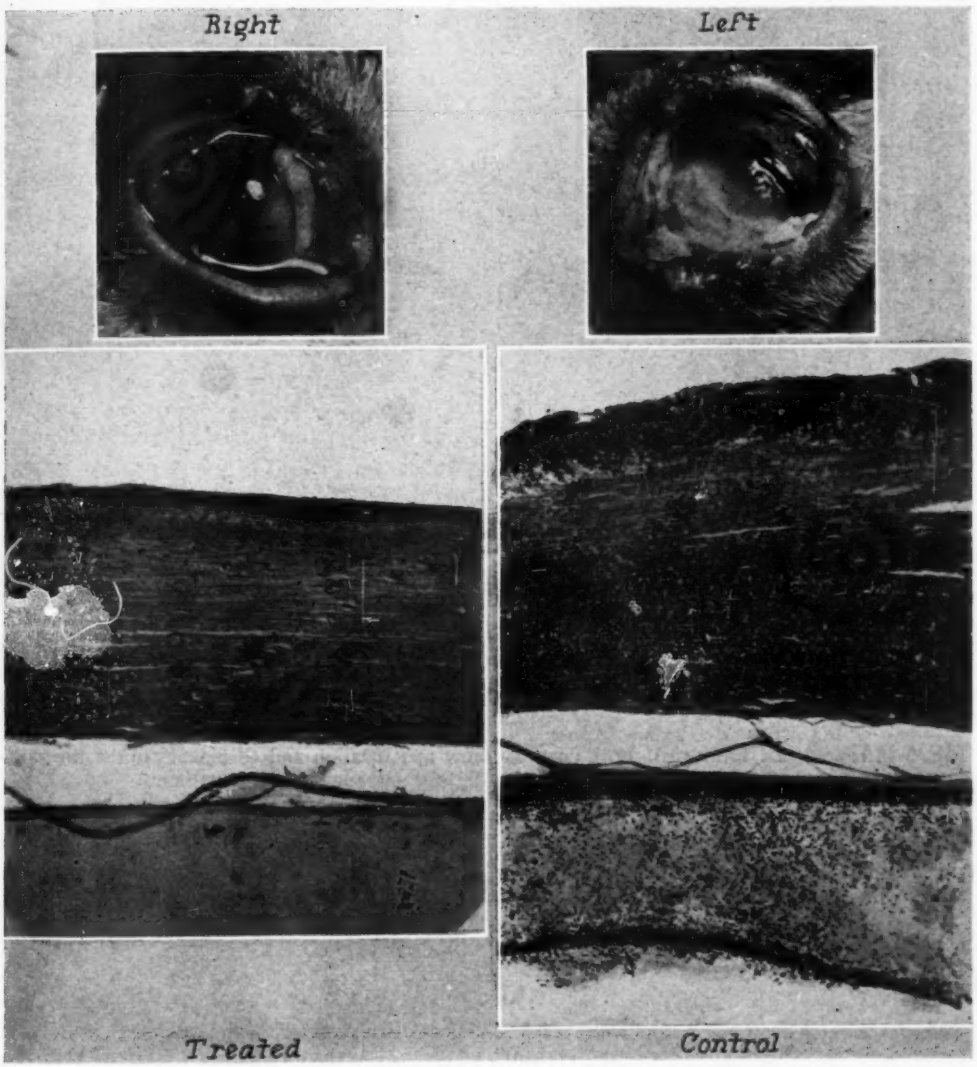


Fig. 5 (Leopold and LaMotte). The control cornea shows a severe corneal ulceration, cellular infiltration, cellular collection on posterior surface, and marked thickening. The treated cornea shows superficial infiltration.

Conclusions

1. Local therapy with penicillin solution reduces the conjunctival discharge, edema, and injection, delays the onset of corneal vascularization, and decreases slightly the amount of corneal edema of ocular lesions due to liquid free-base nitrogen mustard.

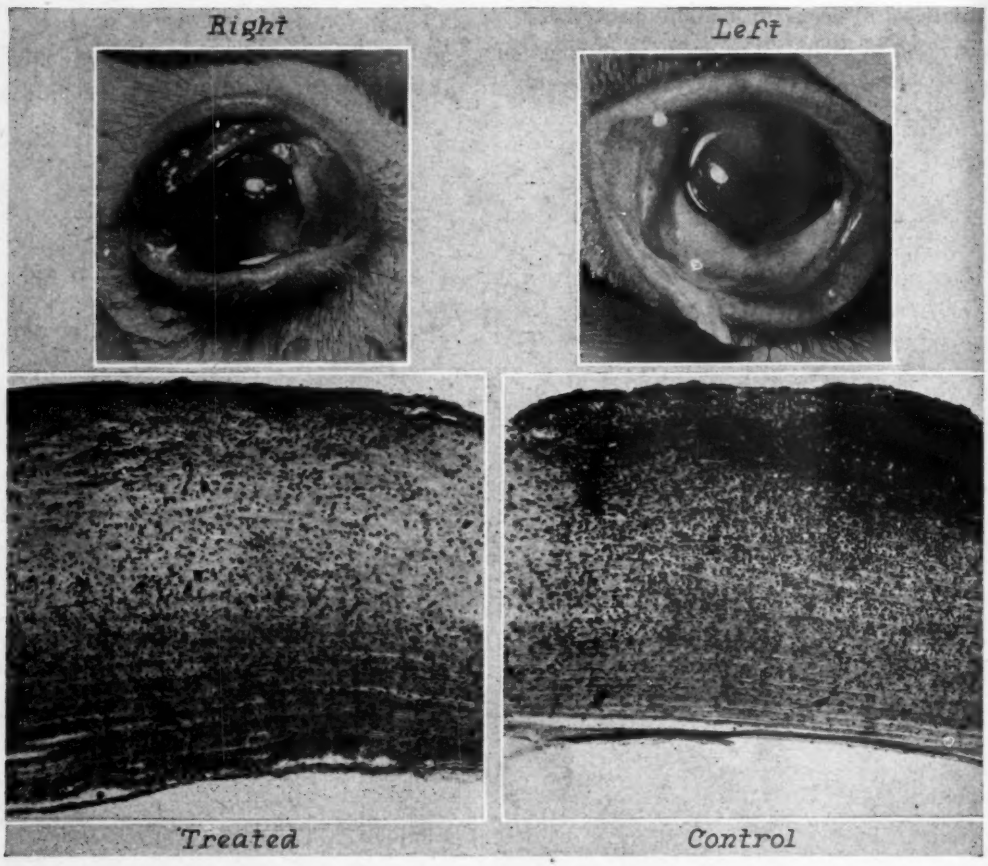


Fig. 6 (Leopold and LaMotte). Both corneas show opacification and edema to almost the same degree. The control eye shows slightly more cellular infiltration.

2. Local penicillin therapy decreases the bacterial flora in nitrogen-mustard ocular lesions.

3. The most marked histologic changes altered by local penicillin therapy in nitrogen-mustard ocular lesions were the reduction in amount of corneal inflammatory cell infiltration and corneal edema.

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REGARDING GONIOPHOTOGRAPHY

RAÚL RODRIQUEZ BARRIOS, M.D., AND
ROBERTO VAZQUEZ BARRIERRE, M.D.
Montevideo, Uruguay

The technique proposed by Goldman for the study of the anterior-chamber angle has, doubtlessly, been simplified for daily application in the clinic.

This investigator has devised a contact lens provided with an inclined mirror that reflects the image of the angle of the anterior chamber for study with the slitlamp; by rotating the lens the angle can be studied in its entirety.

This procedure offers the advantage of permitting extensive studies, with the patient and the ophthalmologist comfortably seated as when making an examination with the slitlamp. In addition, it has the advantage of permitting the study of the angle with slits of variable widths; according to Busacca, when narrow beams of light are used, optical sections of the angle of the anterior chamber are observable, revealing its form with precision.

We have used Goldman's contact lens and Haag-Streit's slitlamp to obtain goniophotographs. For this purpose, as shown by figure 1, in place of one of the

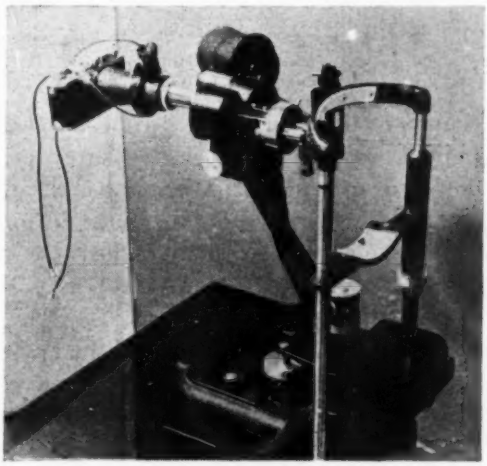
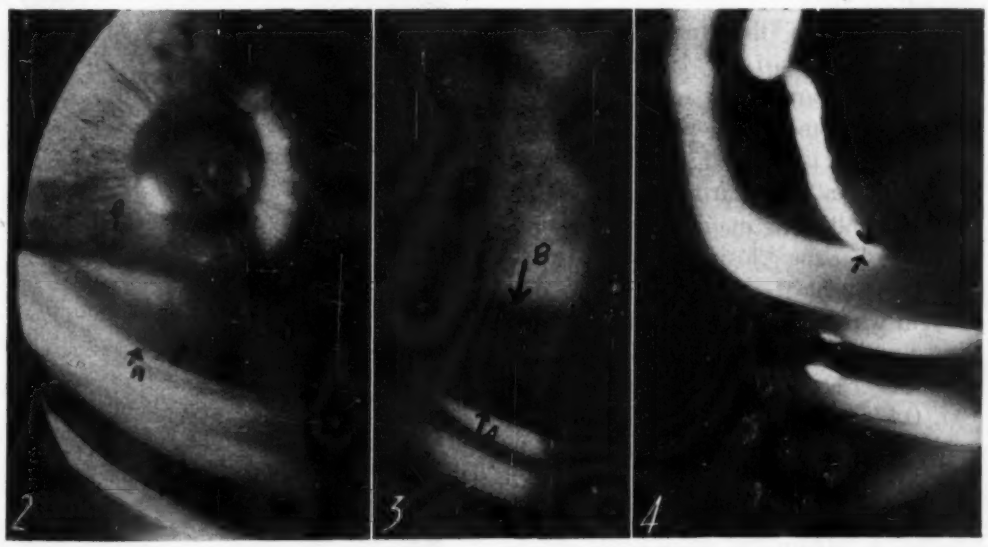


Fig. 1 (Barrios and Barrierre). A Leica camera is inserted in place of one of the oculars of the corneal microscope.



Figs. 2, 3, and 4 (Barrios and Barrierre). Different aspects obtained when wide or narrow slits are used.

Fig. 5 (Barrios and Barrierre). An eye with a dilated pupil.

oculars of the corneal microscope, a Leica camera provided with Leica's microscopic device is inserted. This device has a lateral visor which permits the exact focusing of the part to be photographed.

The procedure is carried out as follows:

The usual steps for studying the angle are taken; then, the Leica, with the micro-Leica in place of one of the oculars, is adjusted. Upon looking through the lateral visor, it will be seen that it has a reticule, the lines of which are sharp and definite when focusing with the lens on this lateral visor.

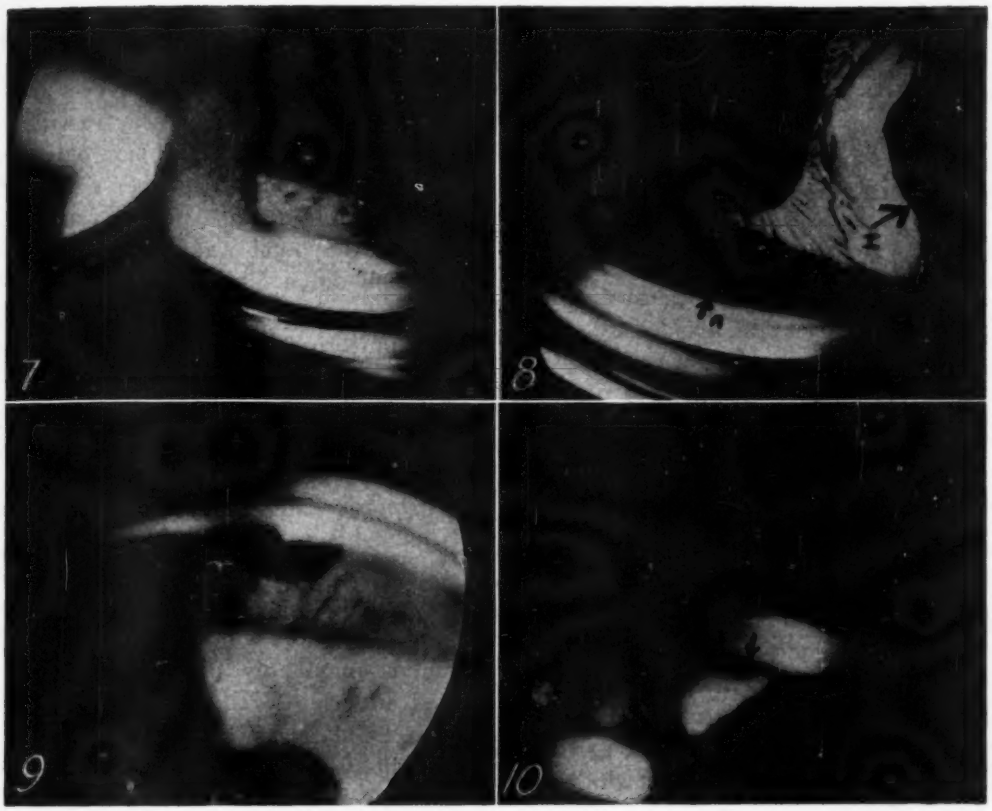
The first step, therefore, is to focus exactly the lens of the lateral visor so that the lines are sharp and clear. Then, with the micrometer, the part that is to be photographed is focused. The Leica must be kept "open" and, through a double release, the following manipulations are obtained: (1) the closing of the lateral visor, and (2) the opening of the diaphragm which permits a variable opening according to the requirements of the case.

In our cases, with Plus-X films, we give 0.5- and 1-second exposures. Unfortunately, we have not been able to obtain color films for artificial light. We believe that with such films it would be possible to obtain far more exact photographs, since these would clearly show the different colors observed in the region.

The accompanying illustrations show the different aspects obtained when wide or narrow slits are used. In taking figure 2, the slit was entirely open. To interpret these photos, it is necessary to remember that an image is obtained in the mirror on the opposite side of the angle. In the case of figure 2, one sees the pupil and, underneath it, a horizontal line (B) corresponding to the limit of the mirror. The opposite angle of the anterior chamber is also reflected (A) which appears as an inclined plane, because that is the position occupied by the reflecting surface. Underneath is a series of lines of little importance because they are merely reflexes in the limit of the contact lens. In figure 3, the slit was narrower, and in figure 4, still narrower. It is possible to narrow it more, but the resulting photograph is not so clear.

As can be appreciated, the narrow slit permits following the faces of the angles and gives us a good impression of depth,

Fig. 6 (Barrios and Barrierre). Same eye as in figure 5 photographed with a narrow slit.



Figs. 7-10 (Barrios and Barrierre). Fig. 7, Photograph with ample angle in which sense of depth is evident. Fig. 8, A case of traumatic iridodialysis. Fig. 9, An antiglaucomatous iridectomy. Fig. 10, This shows the gap opened by the cyclodialysis in a case of essential atrophy of the iris.

not obtainable with the wide slit. It permits, in addition, the comparison of the different angles and their classification according to width. Figure 5 shows an eye with dilated pupil. The folds of the roof of the iris can be clearly seen; these are formed by the dilatation. The arrow shows Schwalbe's line, and, exactly in the angle, a pigmentary nevus can be observed.

Figure 6 is of the same eye, but obtained with a narrow slit. The nevus and Schwalbe's line can be observed, as indicated by the arrows.

Figure 7 is a photograph with ample angle, and all the details are clearly defined; the sense of depth is evident.

Figure 8 corresponds to a case of traumatic iridodialysis. The pupil can be seen, and, at the right, the dialysis zone. In the inferior part is seen, reflected in the mirror, the superior part of the angle of the anterior chamber. The details of the iris can be clearly seen. With this procedure, excellent photographs of the iris can be obtained. Figure 9 corresponds to an antiglaucomatous iridectomy. Finally, figure 10 shows the gap opened by the cyclodialysis in a case of essential atrophy of the iris.

We believe that the perfection of this technique, and especially with the use of color films, will place this procedure among the most useful for goniophotography.

Sán José 885.

NOTES, CASES, INSTRUMENTS

RETINOBLASTOMA*

An unusual case

Albert N. Lemoine, Jr., M.D.
Boston, Massachusetts

It is hoped that by reporting the following case, a similar error in diagnosis and treatment may be avoided by others. This case also serves as a warning against the use of vitreous injections of penicillin in cases of obscure intraocular infections.

A review of the ophthalmic journals since 1925 failed to reveal a similar case. Other cases of mistaken diagnosis were reported, but none had a clinical picture as found in this patient.

The case history is presented in detail because: (1) the physical and laboratory findings, even in retrospection, easily lead to an incorrect diagnosis; and because (2) the patient was subjected to extensive surgical and X-ray procedures which were futile

Case report

P. W., a 3½-year-old boy, was first seen in the Eye Out-Patient Department of the Massachusetts Eye and Ear Infirmary on February 26, 1945, complaining of a red eye and questionable pain of five days' duration.

Three weeks before admission, according to the mother, the boy was hit in his right eye with a stick. His eye was not inflamed, nor did he complain of pain until five days before admission. At that time, his right eye became slightly inflamed, and he complained of a headache during the night. About this same time, the mother noted a "queer" appearance in the pupil of the right eye. The child's general health had been excellent with no recent illness.

Examination. The right eye was slightly injected. The cornea was clear with no evidence of recent nor old perforation. The anterior chamber was clear and of normal depth. The iris was normal, but the pupil was slightly dilated. The pupil did not react directly or consensually to light. Behind the lens there was a uniform, yellowish reflex that was structureless and appeared to be an exudate. The tactile tension was normal. Vision was nil. The left eye was entirely normal with a good red reflex.

Diagnosis. Metastatic endophthalmitis of the right eye was the diagnosis made.

On the same day, February 26th, the child was admitted to the Hospital for a complete medical work-up. The physical examination, X-ray pictures of the sinuses and chest, Hinton and tuberculin tests were all negative. On February 28th, the right eye was moderately injected, but otherwise was the same as on admission.

Because the "inflammatory" process appeared to be more active, the child was taken to the operating room on March 2d and, under ether anesthesia, a needle was inserted into the vitreous. Approximately 0.5 c.c. of creamy, yellow material was aspirated and 8,000 units of penicillin were injected into the vitreous. The aspirated material was sent to the laboratory for culture and identification.

On March 5th, the child was discharged with a diagnosis of vitreous abscess. The culture of the aspirated material revealed alpha hemolytic streptococcus, beta hemolytic streptococcus, and coagulase positive hemolytic staphylococcus. No focus for the intraocular infection had been found.

A week later, the child was seen in the Clinic, and the right eye was white and quiet. The fundus reflex was still yellow. No structure was visible to the vitreous

* From the Massachusetts Eye and Ear Infirmary, Howe Laboratory of Ophthalmology.

mass. On March 26th, the right eye was white and quiet, but the fundus reflex was now becoming gray. There was no visible structure to the material in the vitreous. On April 21, 1945, the right eye was slightly injected. The pupil was still dilated and did not react to light. The iris was now beginning to vascularize.

Four days after this, the child was brought to the clinic complaining of nausea and severe pain over the right side of his head. The eye was injected, and there were numerous new vessels on the iris, with early iris atrophy. The fundus reflex was gray, and there was no visible structure. The tactile tension was normal. The child was given aspirin and no local treatment.

On July 2d, the child returned to the clinic because the right eye had repeatedly "flared up." On this day, the eye was white, and the child did not complain of pain. The iris was atrophic and covered with new vessels. The pupil was moderately dilated and the fundas reflex was gray. There was no visible structure to the vitreous mass.

The child returned to the clinic on July 7th, because the right eye had become red and painful. He was admitted to the Hospital for enucleation of the right eye. On admission to the Hospital, the right eye was moderately injected. The cornea and aqueous were clear. The iris was atrophic and had numerous dilated vessels on the surface. The pupil was moderately dilated and did not react to light. The fundus reflex was gray-yellow, and no structure was visible. The tactile tension was normal. On the afternoon of admission, the right eye was enucleated. The child had an uneventful recovery, and was discharged on the fifth postoperative day.

On August 28th, the child returned to the Nose and Throat Clinic complaining of nasal discharge. X-ray studies of the sinuses revealed increased density in the right maxillary sinus and the right ethmoid region. He was admitted to the Hospital, given intramuscular penicillin, had an uneventful recovery, and was discharged 14 days later. In the meantime, the right socket had healed completely.

The child returned to the Eye Clinic for a routine check-up the first day of October. The pathologic report on the right eye was returned with a microscopic diagnosis of retinoblastoma that had invaded the optic nerve to the cut end. When the eye was opened, the vitreous was filled with homogenous, gray-yellow, structureless debris; and the gross pathologic diagnosis was vitreous abscess. It was only after the routine microscopic examination that the diagnosis of retinoblastoma had been made.

X-ray films of the head, chest, and pelvis were all negative for metastases. Complete physical examination for evidence of metastasis was also negative. On the basis of these negative findings, the child was admitted to the Hospital for exenteration of the right orbit.

On October 2d, under ether anesthesia, an exenteration of the right orbit was performed. The lids and orbital contents were all removed by block dissection. The patient had an uneventful postoperative course, and was discharged on November 2d. Two days before discharge, the microscopic report on the optic nerve removed during the exenteration was returned. The optic nerve was found to contain tumor tissue up to the cut end at the optic foramen. This tumor tissue apparently had not invaded the surrounding tissue and appeared to be confined to the optic nerve only. X-ray films were again taken and were found to be negative for metastases. On November 5th, examination showed the socket to be granulating in very well.

Three days later, the child returned to the Nerve Out-Patient Clinic of the Mas-

sachusetts General Hospital, where a complete neurologic examination failed to reveal any evidence of metastatic lesions. The child was given an appointment for admission to the Massachusetts General Hospital for a right frontal craniotomy and removal of the right optic nerve up to the chiasm. He was admitted to the Massachusetts General Hospital on November 13th. Complete physical, neurologic, and X-ray examinations were negative for metastatic tumor. The next day, under intra-tracheal gas-oxygen-ether anesthesia, a right frontal exposure was made. The right frontal lobe was retracted and the right optic nerve was exposed. There was questionable enlargement of the right optic nerve. The right optic nerve was severed at the chiasm and removed in block dissection. No abnormal tissue was noted in the area.

On December 6th, the child was seen in the Nerve Out-Patient Department where all surgical wounds were found to be well healed. According to the patient's mother, the child had been vomiting after each meal for about three days. When the child was seen in the Eye Out-Patient Department on December 27th, the socket was well healed. There were three firm, painless lumps about the size of duck's eggs on the right forehead. The mother stated that these lumps first appeared three weeks earlier and had rapidly increased in size. The patient was still vomiting after meals and complained of pain over the right frontal area. He was admitted to the Massachusetts General Hospital for deep X-ray therapy. Physical examination on admission revealed multiple, painless nodules over the right forehead and vertex. X-ray films revealed destruction of the paper plate of the ethmoids on the right side, with loss of the entire lower and inner orbital rim. The destruction also involved the right frontal bone and sinus. Other X-ray films were negative for metastatic lesions.

Deep X-ray therapy was started the next day. During the following 17 days, he was given a total of 2,900 R. units through a single portal covering the right orbit and forehead; and 1,900 R. units were applied to the vertex lesion. The 2,900 R. units were given with the 1,200 K. V. X-ray machine in doses of 300 R. units per day; while the 1,900 R. units were given with the 200 K. V. X-ray machine, 300 R. units per day.

Despite the above heavy doses of X ray, the superficial lesions increased rapidly in size, and the orbital cavity became filled with new nodules. The child became progressively drowsy, lost weight, and vomited all feedings. He was discharged on January 15, 1946, because further therapy was deemed hopeless.

On February 26th, the child died at home. According to the mother, during the last two weeks of life the nodules became much larger, the child became more irritable and irrational, and he suffered severe pain. Unfortunately, no autopsy was perfomed to determine the extent of the metastases.

Summary

In summarizing this case, the following features appear important:

1. The clinical picture of a homogenous, yellow, avascular mass floating in the vitreous, typical of a vitreous abcess, proved to be necrotic tumor tissue.

2. The culture of the aspirated vitreous material revealed three pathogenic organisms which are difficult to explain on the basis of contamination. This culture, together with the clinical picture, resulted in the incorrect diagnosis of vitreous abscess.

3. The gross examination of the globe, following enucleation, failed to reveal the presence of the retinoblastoma. The correct diagnosis was made only after routine histologic examination.

4. The extensive surgical procedures of

exenteration and craniotomy failed to prevent a fatal outcome, although they seemed justified at the time as the only hope.

Conclusions

This case illustrates an error in diagnosis that resulted in death from retinoblastoma. With the widespread use of penicillin in ophthalmology, it serves as a warning against the use of vitreous injections of penicillin in suspected infections unless the diagnosis is certain.

This case also lends support to the belief that irritable or painful blind eyes should be enucleated and subjected to detailed histologic examination.

In cases of retinoblastoma with definite extension in the optic nerve and no evidence of metastasis, extensive surgical procedures must be carried out with a very guarded prognosis.

The failure of superficial metastatic nodules to respond to a large dose of deep X-ray therapy illustrates the relative resistance of some retinoblastomas to this type of treatment.

243 Charles Street (14).

SPONTANEOUS CYST OF THE IRIS*

Joseph Laval, M.D.
New York

History

L. P., a man aged 57 years, had had the right kidney removed in May, 1930, for hypernephroma, confirmed on pathologic examination. There were no bone nor visceral metastases at that time. In January, 1944, a mass the size of a grapefruit was noticed in the right flank. It was very firm, hard, and attached to the crest of the ileum. The patient said it had grown slowly for the past four years. On January 18, 1945, he came to Dr. Frey's Clinic with the complaint of a red, painful eye of two weeks' duration. There was no history of trauma.

Examination. The right eye was normal in all respects with normal vision with correction. The left eye had moderate

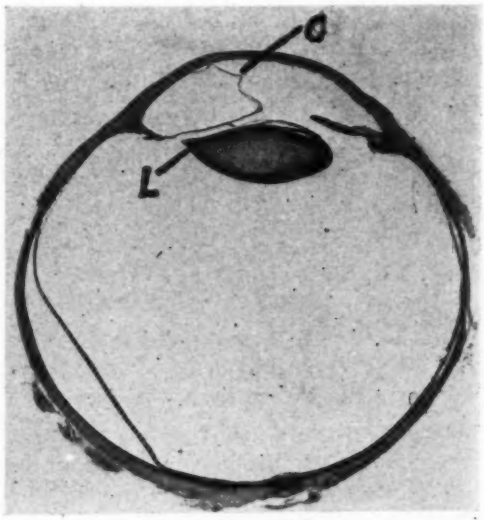


Fig. 1 (Laval). A large cyst (C) has replaced the iris and occupies part of the anterior chamber. It has compressed the lens (L) where it lies in contact with it.

circumcorneal injection with an occasional cell in the aqueous. A large, pale brown, cystic mass filled the temporal half of the anterior chamber, pushing an ovally distorted pupil nasally. It almost, but not quite, reached to the pupil. There were some blood vessels on the anterior wall of the cyst, and the whole mass transilluminated easily. The pupil could not be dilated so that the fundus and media were not examined. Vision of the left eye was finger counting at two feet and was not improved. Tension was: O.D., 20 mm. Hg (Schiøtz); O.S., 23 mm. X-ray studies for metastases were negative. X-ray pictures of the orbit were also negative. The urine, blood count, and the Wassermann reaction were negative. One week after admission, the left

*From the Laboratory of the Manhattan Eye, Ear, and Throat Hospital.

eye was quiet and there was no injection of the globe; the aqueous was clear.

It was decided to enucleate the globe because of the history of hypernephroma of the kidney. Although the mass in the anterior chamber transilluminated, the possibility of a metastasis from the hypernephroma had to be considered.

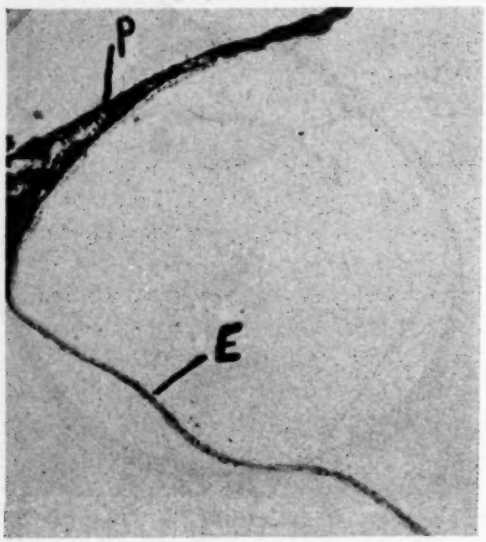


Fig. 2 (Laval). Some of the pigment epithelium (P) is still present and shows areas of cystic degeneration. The endothelial membrane (E) has several layers of cells.

The use of X-ray therapy was also considered, but the final decision was that enucleation was the best thing for the patient.

Pathologic findings

The globe was normal in appearance, size, and shape. On section no gross abnormalities were noted except for the cyst in the anterior chamber.

Microscopic studies showed no abnormalities except in the anterior segment. A large, empty cavity, lined by a thin layer of tissue, replaced part of the iris. The remaining iris was deeply pigmented in the region of the anterior border layer, and crypt formation was absent. There was an increase of chromatophores throughout the stroma, and the iris blood vessels were more numerous than usual. The filtration angle was normal in this region.

On the opposite side, where the iris was missing, the usual filtration angle was entirely absent, and the ciliary body itself had an obtuse angulation. The scleral spur was present and so were the pectinate ligament and Schlemm's canal, but the fibers of the ligament were closely packed and compressed and separated from the anterior chamber by a thin, but solid, membrane. Schlemm's canal was filled with blood cells (probably a post-enucleation result, since the anterior ciliary vessels here were also blood filled). The membrane which lined the filtration angle was continuous along the cornea in contact with, but separately defined from, Descemet's membrane. It was lined with its own endothelium, and the two endothelial surfaces lay back to back. The membrane continued along the anterior face of the ciliary body and then replaced the iris which should normally have been there. It was lined with a layer of pigmented iris epithelium (although somewhat atrophic in appearance) posteriorly. As it lay in contact with the lens, some of the pigment became attached to the anterior capsule and the pressure exerted on the lens caused an indentation in its contour. At this point, the lens cortex was compressed down to the nucleus. A few vacuoles had developed in this region. As the membrane left the posterior region of the iris, it lost its pigment layer and, as it curved forward in the anterior chamber, its anterior wall consisted of endothelial cells in several layers which became compressed into a single layer where they lay in contact with the posterior corneal surface. The cyst cavity was entirely empty having lost its fluid on sec-

tioning. There was no evidence of cupping of the optic nerve head.

Comment

Spontaneous cysts of the iris stroma usually occur in young people under 20 years of age, but one case was reported in a man of 58. They rarely give rise to any symptoms of irritation or to glaucoma. According to Duke-Elder, only 41 cases up to the present have been recorded and accepted as spontaneous cysts without any prior trauma. There is no consensus as to whether the cyst is mesodermal or ectodermal in origin, but the fluid is secreted by the epithelial cells which line the cyst cavity. The textbooks of Collins and Mayou, Fuchs, and Duke-Elder and the *Atlas of Histopathology of the Eye* by A. Fuchs, parts one and two, have no illustrations of a case similar to the one here presented.

136 East 64th Street (21).

A SIMPLE METHOD OF REMOVING EYELASHES BY ELECTROLYSIS*

Jack S. Guyton, M.D.
Baltimore

The root of an eyelash may be destroyed by electrolysis without causing detectable scarring. A galvanic unit such as that devised by Walker may be used for this purpose. However, few ophthalmologists have access to such a unit, and all too many patients with wild lashes are treated by simply pulling the offending lashes every few weeks. Permanent removal of these lashes by electrolysis can be extremely simple, and every ophthalmologist could have available the following inexpensive equipment.

Simplified equipment

1 45-volt "B" battery
1 6-ft. strand of insulated copper wire
1 22,000-ohm resistance (price = 9 cents)
1 hemostat
1 very small straight needle with a sharp point
1 piece of gauze

Technique

Novocaine is injected around the offending lash. The 22,000-ohm resistance is connected to the negative pole of the "B" battery and the wire is attached to this. The other end of the wire is attached to the handle of the hemostat, and the needle is grasped with the hemostat. The ophthalmologist holds the hemostat with a piece of gauze as insulation. The patient is asked to grasp the positive pole of the "B" battery firmly between thumb and forefinger, moistened with saline. The tiny needle is then inserted alongside the offending lash down to the lash root (about 3 mm.) and held there until bubbles of hydrogen come out freely and the lash itself floats out. This usually requires from 5 to 30 seconds.

The principle involved in destroying a lash root in this simple manner is to pass a galvanic current of from 0.2 to 2.0 Ma. through the patient's body. Since the needle (cathode) inserted into the lash root is very small, a sufficient concentration of hydroxyl ions is generated around the needle tip to destroy the hair follicle. The desired amount of current is obtained with a 45 volt "B" battery and a 22,000-ohm resistance in series. The electrical resistance encountered at the contact between fingers and positive terminal of the battery usually varies be-

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* From the Wilmer Ophthalmological Institute of the Johns Hopkins University and Hospital.

tween 10,000 and 100,000 ohms, and the resistance at the tip of the needle is negligible. There is no danger of obtaining too much current because this is limited to 2 Ma. by the resistance unit, even should there be almost no resistance elsewhere in the circuit. Too little current can be obtained if the positive terminal of the battery is not grasped firmly or if the fingers are not moist. The time necessary to accomplish destruction of the hair follicle varies inversely with the amount of current.

The simplified equipment listed above may be elaborated upon, if the ophthalmologist so desires, by: (1) wiring to the positive terminal of the battery a metal sheet which can be grasped by the patient's hand or strapped to his arm, (2) wiring the negative terminal directly to a needle which is insulated except for the tip, (3) insertion of an ammeter in the circuit. However, these elaborations are not at all necessary.

A MOTOR-DRIVEN OPHTHALMOTROPE

MERRILL J. REEH, COL. (MC), A.U.S., E. W. STIMMEL, AND F. V. HEAGAN
Randolph Field, Texas

In teaching large numbers of graduate physicians at the Army Air Forces School of Aviation Medicine, it has been found that the majority have little knowledge concerning the normal and abnormal functions of the extraocular muscles. A small percentage possess knowledge of the function of individual muscles acting upon the globe while in the primary position, but have no understanding of movements in the secondary fields or of the conjugate function involved in the maintenance of binocular single vision. A logical understanding of heterophoria, heterotropia, and paralyses is impossible if the normal functions are vaguely or incorrectly understood.

In order to teach this branch of ophthalmology to a large group in an extremely limited period of time, a motor-driven ophthalmotrope has been constructed (figs. 1 and 2).

Each plastic globe,* 20 inches in diameter, is mounted on a movable table which is 30 by 40 inches in size. An anterior segment showing a cornea, anterior chamber, and iris has been attached to the globe proper. The inner surface of the globe has been painted white. The globe is attached to the stand by means of a ball-and-socket joint. Rotation is present about three axes; however rotation cannot be accomplished in the anterior-posterior axis with the present motor arrangement. Nevertheless, the student can

* The plastic globes were originally planned and developed by Dr. R. G. Scobee, St. Louis, Missouri, while on duty at the A.A.F. School of Aviation Medicine.

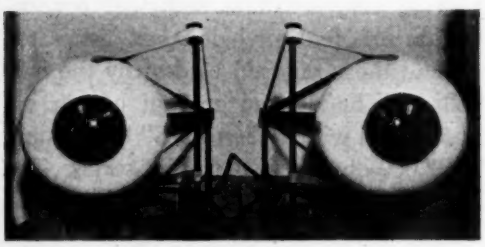

Fig. 1 (Reeh, Stimmel, and Heagan). Front view with eyes in the primary position.

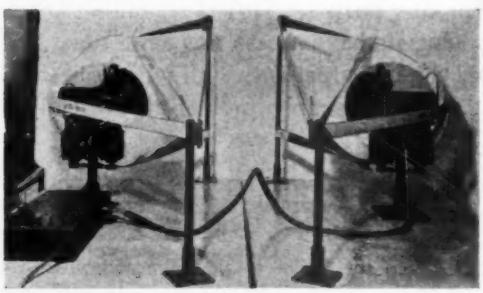

Fig. 2 (Reeh, Stimmel, and Heagan). Rear view with eyes in the primary position.

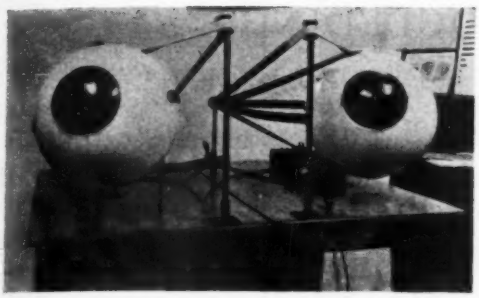

Fig. 3 (Reeh, Stimmel, and Heagan). Front view with eyes rotated right and upward.

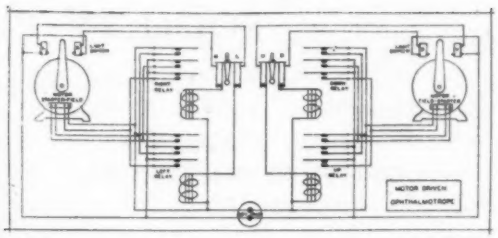

Fig. 4 (Reeh, Stimmel, and Heagan). Diagram of the wiring of one globe. Wiring of both globes is identical.

readily understand such rotation while watching the various movements of the globe. Two one-seventy-fifth h.p. motors are attached to each globe. One motor abducts and adducts, and the other elevates and depresses the globe. When acting simultaneously, both motors move the globe into an oblique position; for example, right and upward (fig. 3). The globes have been mounted on separate, movable tables so that only one need be utilized if desired. The motors attached to both globes have been synchronized so that they move together at the same rate of speed; thus demonstrating conjugate (yoke) action of muscles. Automatic stop switches act in the same capacity as check ligaments. There is a separate switch for each globe in addition to the two master switches in the main control box. This permits the operator to stop one globe during binocular rotation; thus simulating the lag which is manifested by a paralyzed muscle. The muscles have been made of red-colored elastic straps bearing the appropriate name in black letters. The elasticity thus simulates the normal muscle tonus. The superior and inferior rectus muscles produce a 25-degree angle, and the superior and inferior oblique muscles produce a 54-degree angle, with the optical axis when the globe is in the primary position. A metal pulley acts as a trochlea for the superior oblique muscle.

By means of this apparatus, one can demonstrate the functions of the extraocular muscles when the globe is in the primary and secondary positions. The conjugate (yoke) functions can also be demonstrated, as well as the primary and secondary deviations found in various paralyses. By means of the individual control of the globes, lagging and overaction as seen in various paralyses can be simulated. In addition, this model can be used in demonstrating convergence and divergence, heterophorias, heterotropias, and the use of prisms for the measurement of vergence power.

Conclusions

A motor-driven ophthalmotrope has been developed for the purpose of demonstrating to students the normal and abnormal functions of the extraocular muscles. Such a model will be of value in the teaching of postgraduate students, medical students, and orthopticians.

A.A.F. School of Aviation Medicine.

SOCIETY PROCEEDINGS

Edited by DONALD J. LYLE, M.D.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

November 20, 1945

DR. THEODORE L. TERRY, *presiding*

A NEW SYNTHETIC MYDRIATIC

PROF. IDA MANN of Oxford, England, wrote a paper on this subject which was read in her absence by the secretary of the Society, Dr. Merrill King. She described a new synthetic mydriatic, known experimentally by the code name, E-3, and commercially as Lachasine, which was a benzylic ester of hydroxy-ethyl-di-methyl-ethyl ammonium chloride. For experimental use, a 1-percent solution was used. When used in healthy eyes, it appeared that E-3 could be used for diagnostic and refractive purposes the same way as atropine. The reaction was more easily reversed by eserine than that of atropine. In old people, however, it is not as safe as homatropine. It appeared to lie between atropine and homatropine in its strength of action on normal eyes.

In a second group of six treatment cases, E-3 was used satisfactorily as a substitute for atropine. In a group of six patients who had had general toxic symptoms from atropine and hyoscine, it was used satisfactorily without any general symptoms and was satisfactory to the patient. In a fourth group of 42 cases, E-3 was used with striking results. All of the patients in this group had had local atropine irritation after atropine had been used for a varying length of time. Some of these patients were also sensitive to hyoscine and homatropine. All of these cases were switched to E-3; no signs of local irritation were produced; and the previous signs of irritation from homatropine and similar drugs disappeared while E-3 was being used. With this series, it was also noted that E-3 had to be used more frequently when being substituted for atropine.

This drug can be obtained commercially from Messrs. Allen and Hanbury, Vere Street, London W, 1.

HYPERTENSIVE RETINITIS

DR. ARTHUR J. BEDELL of Albany, New York, read an interesting paper on the above subject illustrated by a large number of very fine Kodachrome slides. The instructive value of these slides came, not only from the photographs of the various changes that occur in hypertension, but also from the pictures which permitted one to observe the alterations which took place in the same patient over a long time, often years. He stressed the changes seen in the blood-vessel walls, especially the narrowing of the arteries, compression of the veins when crossed by the arteries, and atheromatous plaques in the vessel walls. He said that mere tortuosity of the blood vessels was not evidence of hypertension. He presented evidence proving that edema of the retina is present prior to the formation of the star in the macular region and that, previous to death, the star lines become broken and partially absorbed, a sign of great prognostic significance. He illustrated the various types of hemorrhages and exudates seen in patients with hypertension.

Dr. Bedell believed that many patients were symptomatically relieved by operation. The headache, especially occipital, was frequently cured, and the blood pressure often, but not always, reduced. He stated that hemorrhages and exudates

may disappear but stressed the fact that the retinal blood vessels rarely showed much improvement. The veins were more often decreased in caliber than the arteries. He had seen many patients in whom the retinal appearance was unchanged and the course of the hypertension uninfluenced.

Dr. Bedell felt that the term "transitory local constriction" of the arteries was to be preferred over "local spasm." He urged great care in describing the fundus changes to differentiate benign hypertensive retinopathy from the fulminating type.

Mahlon T. Easton,
Recorder.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

December 18, 1945

Dr. Theodore L. Terry, *presiding*

Action spectrum of ultraviolet keratitis

Dr. David G. Cogan said that the present study consisted of a quantitative determination of the ultraviolet bands capable of producing an abiotic reaction in the cornea and a comparison of the radiations which produce a keratitis with those which produce erythema. For the cornea, the action spectrum was found to have a sharp peak at 288 mu which is not materially different from the corrected peak for skin. Although there is no substantial difference in the absorption spectrum and action spectrum of skin, there is a difference in the absorption spectrum of the cornea and the action spectrum of keratitis. It was concluded that the absorption spectrum of the cornea is largely determined by the nucleoprotein (peak at 265 mu), while the action spectrum is determined by a photolabile substance with absorption shifted toward the longer wave lengths (peak at 288 mu). The action spectrum of keratitis is compatible with the assumptions that the photolabile substance is either one of the cytoplasmic proteins (albumen or globulin) or a specific portion (amino acids containing phenyl rings) of the nucleoprotein.

Since ultraviolet keratitis is a common occupational hazard (for example, among welders), the transmission characteristics of various types of common glass were measured for that portion of the spectrum which is responsible for keratitis. By comparison of these characteristics with the action spectrum for keratitis, it is possible to determine the amount of protection provided by any one glass.

This study was made with the help of V. Everett Kinsey, Ph.D.

Random observations on ocular surgery

Dr. Cecil S. O'Brien read an interesting paper on the above subject. Dr. O'Brien said that morphine may be given preoperatively unless there is a wide corneal section. There is danger, of course, from vomiting. For topical anesthesia, cocaine is used, with the exception that, in glaucoma where the pupil is not to be dilated, pontocaine is used. Cocaine is also injected subconjunctivally in a 1-percent solution. Retrobulbar injection of procaine is one of the most important developments in ocular anesthesia. Akinesis of the orbicularis can be obtained by the O'Brien technique of injecting the branch of the 7th nerve. Preoperatively 5 to 20 million units of typhoid vaccine are given for prophylaxis, one or two days before the operation. Penicillin ointment is used every two hours for two days before the operation. For cataract operation, the pupil is dilated with homat-

ropine and paradrine. Dr. O'Brien believes that the axis of the section may cause the resulting cylinder axis to be off. The easy method and the type that gives less astigmatism of section is to begin with a keratome and enlarge with the scissors. The basal iridectomy is preferred because there is less loss of vitreous. He prefers modified Stallard suture with two more sutures, one on either side of the center suture. Air is injected into the anterior chamber to prevent anterior synechia and incarceration of the iris. No ointment is used in the dressing because of the danger of its getting into the anterior chamber. If both cataract and indications for glaucoma surgery are present, Dr. O'Brien prefers a cataract extraction plus a Lagrange operation.

In cyclodialysis, he believes that almost half the circumference should be done, if possible. Dr. O'Brien also feels cyclodialysis is the best operation for glaucoma when tension is slightly increased, and there is a small visual field. In aphakic cases of glaucoma cyclodialysis is the operation of choice. Gonioscopy is of value in determining the area upon which to operate.

In surgery for convergent strabismus three important factors must be taken into consideration in order to obtain maximum results: (1) Proper correction for the refractive error must be worn for at least one year; (2) effect of occlusion on amblyopia; (3) effect of proper training.

In strabismus of more than 15 degrees, he prefers a two-stage operation. First, recession of the internal rectus, and then, three or more months later, resection and advancement of external rectus. The most frequent causes of failure in strabismus surgery are: (1) poor vision in one eye; (2) inferior oblique spasm; (3) abnormal correspondence; and (4) eccentric fixation.

Dr. O'Brien stated that an adequate approach to tumors of the orbit could be obtained by doing a wide canthotomy and enlargement of the wound into the fornix. He felt the cosmetic result was better after using this method than when some of the other approaches were used.

Dr. Mahlon T. Easton,
Recorder.

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

January 8, 1946

Dr. C. K. Lewis, *presiding*

Retinoblastoma

Dr. E. C. Ellett reported an unusual case of retinoblastoma. On April 13, 1944, Edward M., aged eight months, was seen. The right eye had been inflamed for two days. He had had similar mild attacks twice before. There was a history of bumping the head. The left eye was normal. The right lids were swollen and red. The conjunctiva was edematous; the cornea was normal; the aqueous, dark and cloudy; and the pupil only faintly seen. There was a tremulous look to the iris. Tension was +2. Faint reflex and faint light were present on transillumination. The condition appeared to be a contusion with hemorrhages in the eye or a metastatic ophthalmia. General examination, X-ray studies, and all laboratory tests were negative (Dr. Arthur Quin).

Sulfanilamide was ordered (2½ gr. four times a day). The eye cleared, tension seemed normal, and two small, white nodules appeared on the temporal half of the iris. The child did not seem sick and, on April 29th, the eye was white, tension normal, pupil wide, and reflex fair. The white dots on the iris remained the same.

On May 6th, the child was fretful as if in pain. The aqueous was lightly tinged with blood, and the pupil was only visible by transillumination. The eye cleared in a few days. Tension remained normal, but the aqueous was still reddish. On May 20th, the anterior chamber was full of blood, and a paracentesis was done, although the tension was normal. Much thin, bloody fluid escaped, and the eye collapsed but refilled by that afternoon.

The father, who was in service, was transferred to a post in Alabama, and the child was referred to Dr. C. A. Thigpen of Montgomery, who wrote on May 27th as follows: "Anterior chamber filled with blood, a diffuse haziness of the cornea, ciliary injection, unable to see the pupil with intense illumination, eyeball soft. The condition is certainly a very puzzling one, and I doubt very much if the fall had anything to do with it. It impressed me as being one of those rapid cases of acute uveitis, possibly, of tuberculous origin. The eye, in my opinion is doomed."

The child was seen by Dr. Anthony in August, who noted: "Right eye slightly congested. Tension, one minus. Cornea and ball look a little smaller than normal. Anterior chamber looks deep. Considerable amount of blood stain on posterior surface of cornea."

The next note was in a letter from Dr. Thigpen, September 18, 1945: "The outlook for the future of the eye was hopeless and so I advised the parents. The left eye was apparently normal so far as anyone could tell in so small a child.

"I neither saw nor heard of the case again until the early part of April this year when the parents returned saying that the child was losing the vision in the left eye. Examination disclosed a dilated pupil through which one could easily see a projecting floccular, white mass covering the entire temporal side of the retina and extending below and across to the nasal side. This could be well seen without the ophthalmoscope. The mass was tremulous and the slitlamp showed no blood vessels. The eye was turned upward, and only a small area of the retina was sensitive and had any vision which was peripheral. There was no evidence of any inflammatory process. The tension was not above normal limits. The result of my examination convinced me that total blindness was inevitable.

"My verdict was so shocking and distressing to the parents that they hurried off to the Mayo Clinic and remained there several weeks, during which time penicillin and other remedies were used to no avail. Then, suddenly, the right eye became inflamed, followed by intense orbital cellulitis with marked exophthalmos, and removal of the eye was advised. This they decided not to do, but returned to Montgomery. I fully agreed that nothing short of enucleation could be considered. This was done today. I discovered that there had been a profuse retrobulbar hemorrhage which explained the exophthalmos. Thinking that you might be interested in the outcome of the case, I am sending you, under separate cover, the eyeball. There were so many adhesions that it was impossible to do a very clean enucleation."

The eye was sent to the Army Medical Museum, and they reported the preliminary examination on October 9th: "Reveals a retinoblastoma which has extended through the sclera, forming a small orbital tumor mass adjacent to the optic nerve."

In December, 1945, the left eye was enucleated. The child died, January 7, 1946.

Ossification of the choroid

Dr. E. C. Ellett reported the case of Mrs. P., who was seen in 1941 with a

history of the loss of the right eye at childbirth, 28 years before. She was said to have had a hemorrhage in or behind the eye. The eye was shrunken and divergent. The pupil was adherent to a cataractous lens. Tension was 18 mm. Hg (Schiøtz). She complained of pain around the eye and was advised to have it removed. The pain has continued in the eye and head without any change in the eye, but recently the eye seems tender and the possibility of ossification of the choroid suggested itself. X-ray pictures were taken by Dr. Anthony who will report on them.

Glaucoma signs and symptoms

Dr. E. C. Ellett reported a series of cases presenting the signs and symptoms of glaucoma without a rise of intraocular pressure.

Case 1. P. R., aged 60 years, was seen in 1943 with failing vision and a diagnosis of glaucoma two months before. Vision in each eye was 6/6 with glasses. He was a diabetic and on a diet. The discs were definitely white and cupped. Tension in both eyes was 18 mm. Hg (Schiøtz). He had had different opinions as to the advisability of operation. Fields were shown. Blood pressure was 175/125. Iridencleisis was performed in the left eye in May, 1943, and five days later in the right eye. In November, 1945, vision was still 6/6 in each eye. Tension was 15 and 23 mm. The discs were the same, and fields as shown.

Case 2. C. D., a man aged 68 years, had had blurred vision in the right eye for a year. Vision in this eye was 6/18 with glasses; in the left eye, 6/6 with glasses. The right eye showed a few lens and vitreous opacities. The optic nerve was white and slightly cupped. There was no overhang. Vessels were pushed nasally. In the left eye, the media were clear. The optic nerve was of a better color and less cupped. Pupils were 4 and 3 mm. and feebly active. Fields were as shown. Tension was 20 mm. in both eyes. This patient was put on a 1-percent solution of pilocarpine. He was seen by Dr. Arnold Knapp who wrote that he did not think the trouble was glaucoma but was of vascular origin: "that type of optic atrophy with a shallow excavation which is probably due to interference in the nutrition of the optic nerve." He found the tension to be normal. In November, 1945, vision was: 6/15 and 6/6. Tension was: O.U., 30 mm. Fields were as shown.

Case 3. Mrs. C., aged 52 years, was seen October, 1945, with failing vision for a year. Vision in the right eye was poorer than in the left. The disc of the right eye seemed to be partially cupped. The left nerve was normal. Tension in both eyes was 23 mm. In December, the findings were the same. She had been told she had glaucoma and was using pilocarpine. The only field defect was a central blur in the right eye. Vision was: O.U., 6/7.5, with glasses.

Case 4. Mrs. T., aged 78 years, was seen October, 1945. She had been told she had cataracts. Vision was 6/7.5 and 6/15, with glasses. Tension was: O.U., 26 mm. Pupils were 5 and 5½ mm. and feebly active. Incipient cataracts were present. The optic nerves, clearly seen, were pale and slightly cupped. Fields were as shown. She was given pilocarpine drops. A month later the condition was unchanged.

This condition of signs and symptoms of glaucoma without a rise of ocular tension has been long recognized and frequently discussed. Fuchs thought that a weak lamina could yield while the nerve fibers were intact, and might yield before a normal intraocular pressure. Schnabel thought that the primary process was a neuritic atrophy forming small spaces which coalesce. The connective tissue pro-

liferates, contracts, and pulls the lamina back. Duke-Elder describes hypertension as "that pressure which the tissues of that particular eye are unable to withstand without damage to structure or function." Mauthner and Magitot think the condition represents a true glaucoma. Redslob reported a case with tension of 15 to 20 mm. not raised by provocative measures nor affected by a bilateral cervical sympathectomy.

Arnold Knapp, in 1932, made a most significant and valuable observation in attributing the trouble to radiographically demonstrable calcareous degeneration in certain arteries at the floor of the cranial cavity.

Persistent edema following novocaine injection

Dr. J. Wesley McKinney reported the cases of Mrs. L. R. and Dr. C. G. T. On December 11, 1945, a small chalazion of the right lower lid of Mrs. L. R. was curetted after novocaine infiltration. On the following day, December 12, a chalazion of the right upper lid of Dr. C. G. T. was curetted after novocaine infiltration. In both of these patients, there resulted a marked edema of both the upper and lower lids without induration or tenderness. There was no infection about the wounds which healed uneventfully. The edema, however, was of such degree as to be incapacitating for both and persisted for approximately four weeks in the former, and three weeks in the latter. The technique of injection and preparation of the novocaine from the ampules was, as far as we could determine, no different from that usually employed. From the box of novocaine ampules, three injections without unusual reaction had preceded these two. The remaining ampules were sent to the Winthrop Company for analysis. No impurity was found in the ampules examined.

Basal-cell carcinoma of orbit

Dr. J. Wesley McKinney reported the case of Mrs. J. T. P., aged 68 years, who gave the history of a sore at the inner corner of the right eye for nine years. This sore had gradually spread in spite of three series of five X-ray treatments. For the past three months there had been much pain, and there was an annoying diplopia.

Examination. Vision was: O.D., 6/12; O.S., 6/6. The left eye was normal. Between the right eyeball and medial wall of the orbit, there was a deeply excavated ulcer with granulating sides; the globe was fixed by the mass of infiltrating tissue. The eye was internally normal. General physical examination was negative.

On February 29, 1944, the right eye was enucleated, and the large electrocautery was applied widely to the orbital tissues. The cautery was held against the bone, nasally, to insure that any cancer cells that might have invaded the bone would be killed. Pathologic report was basal-cell carcinoma. The immediate postoperative course was uneventful. Over a period of several months, the orbital tissues granulated and became clean. Sequestra of bone have been removed from time to time. There are now several openings into the ethmoid and maxillary sinuses. No evidence of recurrence has been noted in the nearly two years since operation.

Lymphosarcoma of the orbit

Dr. J. Wesley McKinney reported the case of G. H. R., a man aged 59 years, who was first seen August 13, 1943. The history was that there had been swelling about the left eye for about three months. Three weeks before, the swelling had become rapidly more marked. Vision was much impaired. There was a feeling of fullness but no pain. He complained of general weakness.

Examination. Vision was: O.D., 6/6;

and O.S., 6/18. The right eye was normal except for a slight puffiness of the lids and a small subconjunctival hemorrhage, temporally. All around the left eyeball and displacing it inward was a firm mass which caused protrusion of the lids. A globular mass was seen pushing out the upper fornix temporally. The globe was fixed by the mass. The pupil was active, and the eye was internally normal.

A biopsy was taken from the subconjunctival mass, and the laboratory reported a highly malignant tumor of probable connective-tissue origin resembling melanoma without pigment and probably not radiosensitive. He was sent to an internist who reported no evidence of tumor elsewhere.

On August 20th, an exenteration of the orbit was performed, including the lids and periorbita. The entire mass was sent to the Army Medical Museum. The report sent back was: lymphosarcoma, mixed reticulum-cell type. On September 3rd, a small mass appeared in the right upper lid which disappeared promptly under X-ray therapy. On September 14th, many subcutaneous nodules appeared over the entire body. Three weeks later the patient died.

Panophthalmitis following iridencleisis

Dr. Philip Meriwether Lewis reported the case of G. P., a white man aged 73 years, upon whom he had done a bilateral iridencleisis in 1937 for chronic simple glaucoma. For over eight years, the intraocular pressure remained normal and useful vision was maintained. About December 15, 1945, the left eye became quite red and sore. The pain became worse every day and, when seen on December 22, 1945, a purulent panophthalmitis was present. There was a spot of complete necrosis through the conjunctiva at the site of the scleral opening. Evisceration was performed immediately. A purulent infection involved every structure of the eye except the lens. Penicillin ointment was put in the scleral cavity, and 20,000 units of penicillin were given intramuscularly every three hours for 10 doses. Recovery was uneventful.

This was the only panophthalmitis following iridencleisis seen in about 12 years' experience with that operation for glaucoma. It had occurred in two cases following trephines.

COLLEGE OF PHYSICIANS OF PHILADELPHIA

Section on Ophthalmology

December 20, 1945

Dr. Warren S. Reese, *chairman*

Amblyopia due to dietary deficiency

Comdr. A. D. Beam (MC) U.S.N.R. (by invitation) reported on eight cases.

Early in the spring of 1944, the United States Naval Hospital in Philadelphia was designated by the Surgeon General as the national center for the rehabilitation of blinded personnel of the Navy and Marine Corps. Only those men whose vision was 20/200, or less, in the better eye, with correction, were admitted to this special service. At the time of the report, there had been 165 admissions. Of these patients, 101 had suffered loss of vision as a result of traumatic injury; 29, as a result of methyl-alcohol poisoning; and 27, following various ocular diseases. The remaining eight patients became blinded during their period of imprisonment under the Japanese. It is this prisoner-of-war group of patients with whom we are concerned in this report.

All eight of these men, with normal vision on enlistment, were captured at the fall of Corregidor. Five of them were marines and three were sailors. Only one

of them had sustained physical injury during the encounter prior to capture, and that injury was confined to the lower extremities. All of them were between 20 to 32 years of age. For a period of five months before capitulation, their living conditions had been far from satisfactory, and their diet had been rationed and steadily reduced. Following capture, all eight of these men survived the death march from Bilibid to Cabanatuan where six of them were imprisoned until the date of liberation on February 4, 1945. The remaining two had been taken to Japan after they had begun to have visual deficiency.

During their period of imprisonment, all of them were forced to engage in strenuous physical labor and suffered the physical hardships of a discipline now so well-known to all of us. Weight loss of these eight men varied between 40 to 70 lbs. Diet during the entire period of incarceration was far below that specified by international law. The average daily intake was 200 to 300 gm. of polished rice (about 7 tbs.), and a thin soup, made from sweet-potato vine, was given about three times a week. This constitutes a diet of approximately 1,000 calories per day. Occasionally the intake was greater or less, but this represents the usual food intake. All of these patients showed evidence of severe beriberi, and seven of them had pellagra of varying degrees of intensity.

Visual loss appeared in all of them without other specific prodromes and proceeded to the maximum deficiency in one to four weeks. Blindness in all of these prisoners developed between 4½ to 8 months after capture. Once the loss of sight was established, it remained static, even after they were freed and given various forms of therapy. Loss of vision was painless in each instance and, other than the signs of dietary insufficiency, there were no common factors that would suggest a toxic, infectious, or traumatic etiology.

Seven of the patients also developed bilateral-nerve deafness; the loss of hearing varied from 11 to 36 decibels. Deafness was a feature concomitant with visual loss and was first noted at the time of blindness or soon thereafter. All of these eight men had some evidence of peripheral neuritis, as did nearly all of the other prisoners. None of these men had symptoms of night blindness but, on the contrary, found that their vision was better during twilight or early evening. Hypoproteinemia and occasional bouts of diarrhea were common to all of the prisoners, including those under discussion. All of these patients stated that there were many other prisoners who developed blindness in a similar manner, but who failed to survive the period of confinement for one reason or another.

These eight men with severely impaired vision present histories and physical findings which indicate that their visual loss probably resulted from dietary deficiency. However, the possible effect of some chemical intoxication cannot be completely disregarded, even though there does not seem to be any common factor. The effect of a prolonged deficiency diet upon the visual sense of man during a period of strenuous and enforced labor has never been determined. Therefore, the etiology may have been influenced by three groups of factors: (1) deficiencies in such required elements as vitamins, minerals, and proteins; (2) intoxications of a chemical and bacterial nature; and, (3) the effect of strenuous physical activity with inadequate caloric intake. We feel that we are unable to state just what influence each of these would have had upon the development of blindness under the circumstances just related but, from the endless array of published data, it

would appear that avitaminosis would be the principal factor to consider. However, in discussing vitamin deficiencies, I do not intend to exclude the possible effects of other contributing factors or to indicate any assessment of their influence.

Only the vitamins usually thought to be concerned with the physiology of the eye will be considered, excluding vitamin D.

Vitamin A. The minimum daily requirements for vitamin A is considered to be about 5,000 international units. The source of vitamin A in the diets of these men was limited to that contained in the thin soup made from vegetable leaves and water. None of these men suffered night blindness and only two showed evidence of corneal disease upon admission to our hospital. One patient had developed a perforating corneal ulcer in his right eye, although there were no opacities nor history of inflammation of the left eye. On examination, the lower two-thirds of the cornea of the right eye was opaque and vascularized, and there was an anterior synechia. The left eye did show proliferation of the limbic vessels. One other patient had suffered "sore eyes" three months after capture. An American doctor told him that he had corneal ulcers, which became symptomless with no change in diet and the treatment limited to instillation of yellow oxide of mercury, once daily. When this man was first examined here, there were seven or eight superficial opacities of each cornea associated with well-marked proliferations of the limbic vessels. The corneal opacities were not dense, and there was very little loss of corneal substance. These two cases may represent keratomalacia and xerosis of the cornea respectively, although neither of them showed evidence of conjunctival xerosis nor had they suffered hemeralopia.

Vitamin B_1. Vitamin B_1, or thiamin, has been proved necessary in maintaining normal neurologic function. Inadequate ingestion, absorption, or utilization of this heat labile portion of the vitamin-B complex causes the disease known as beriberi. The Committee on Nutrition of the National Research Council recommends between 1.5 and 2 mgs. daily for a well-balanced diet.

The rice which these men ate was chiefly polished. The polishing process, like the milling of flour, removes valuable constituents, notably the vitamins, protein, and mineral elements. The discovery that a diet which consists solely of polished rice will produce beriberi gave an early incentive to the study of vitamins. Polished rice is practically devoid of all vitamins, but beriberi is due specifically to the lack of vitamin B_1.

Each man in this group suffered symptoms of severe beriberi including peripheral neuritis, edema of the extremities, weakness, anorexia, and diarrhea. Palpitation and shortness of breath were noticed by three of them. Massive doses of vitamin B_1, given upon liberation in 1945, relieved all of these symptoms, but the amblyopia which had occurred during the attack of beriberi was not improved. One patient received large doses of vitamin-B complex, seven months after his vision failed, when the Japanese picked a group of 100 prisoners, all suffering from beriberi, to half of whom they gave vitamin therapy in addition to the usual diet; the other half of the group was kept on the unfortified rice and soup diet. This man improved during this study as far as his neuritis, edema, and weakness were concerned; however, there was no change in his vision during, or following, the six weeks of the experiment.

On admission to our service, the vision of these eight men ranged from 1/200 to 10/200 in the better eye. Each had bi-

lateral, absolute, central scotoma which extended 5 to 12 degrees from the fixation point; two also had bilateral, concentric contraction of the peripheral fields. The pupils were semidilated and reacted sluggishly to light. Funduscopic examination was essentially normal, except that each man showed evidence of bilateral optic atrophy varying from well-marked temporal pallor to advanced optic atrophy. The atrophy was of the primary, or descending, type. Treatment consisting of high vitamin diet supported by large doses of thiamin has failed to cause any visual improvement in these cases. There has been considerable evidence in the literature to support the theory that lack of thiamin in the diet may cause retrobulbar neuritis and optic atrophy, if the condition remains untreated. The dietary deficiency in chronic alcoholism is a classic example.

Vitamin B_2. Pellagra is a disease of nutrition caused by deficiency of vitamin B_2, or nicotinic acid. Although other factors of the B complex may contribute to this disease, their significance is uncertain. Typical cases of pellagra are characterized by three groups of symptoms: (1) a typical form of dermatitis; (2) digestive disorders with or without diarrhea; and (3) psychoses of the confusional type. Typical signs of this disease occurred in seven of the eight cases presented. The other patient apparently had no evidence of pellagra even to the extent of glossitis, which is often one of the first signs of nicotinic-acid deficiency. Although peripheral neuritis and optic atrophy have been attributed to this disease (P. B. Wilkinson), it is probable that concomitant vitamin-B_1 deficiency is the true etiologic factor. Optic atrophy and peripheral neuritis occurring in the one patient who suffered no signs or symptoms of pellagra tends to support this belief. These men suffered no ocular change which we feel can be directly attributable to nicotinic-acid deficiency. Their pellagra healed soon after liberation, when they received large doses of vitamin-B complex.

Riboflavin. In 1940 Sydenstricker described the ocular effects of a riboflavin deficiency which included the symptoms of photophobia, sensations of roughness or burning of the eyelids, and visual fatigue. The commonest sign was circumcorneal injection, often with invasion of the cornea by capillaries from the limbic plexus. Superficial corneal nebulas were also noted. These signs and symptoms responded favorably to riboflavin therapy. Four men in this group had a history of "sore eyes" and photophobia during their period of incarceration. Three of the four exhibited definite limbic proliferation, and one showed superficial corneal opacities upon examination here. The remaining men showed no evidence of limbic proliferation. Local areas of proliferation, usually traceable to some antecedent corneal inflammation, were not considered. Symptoms of photophobia and burning were relieved soon after liberation, when adequate vitamin therapy was instigated; however, no change in the vessel proliferation was noticed during the past 8 to 10 weeks. Riboflavin (5 mg.) has been administered daily since they arrived here.

Vitamin C. The eye manifestations of vitamin-C deficiency are probably limited to ocular hemorrhage in patients with scurvy. However, there is some evidence that cataract formation may be influenced by lack of this vitamin in the diet. Three of these cases were told that they had scurvy at one time or another while prisoners on Luzon. Their description of the skin lesions is not typical, although their gums were swollen and bled easily. They gave no history of subcutaneous hemorrhage nor bleeding other than from the

gums and nose. Examination here revealed no ocular pathology attributable to vitamin-C deficiency.

Comment. In this group of eight men who became amblyopic on an inadequate diet during imprisonment, the outstanding ocular pathologic change common to all eight of them was the optic atrophy with central scotoma in each eye. Dietary deficiency, notably vitamin-B_1 deficiency, appears to have been the etiologic factor. Signs and symptoms of severe beriberi were present in each case; thus establishing proof of thiamin deficiency. An analysis of the diet, the bulk of which was polished rice, reveals little or no source of this vitamin. Rice, containing 79.4-percent carbohydrates, 7.6-percent proteins, and 0.3-percent fat, gave these men a high carbohydrate diet. It has been well established that thiamin requirements increase with the carbohydrate intake and with physical exertion. Ten hours of hard labor per day, associated with a high carbohydrate diet increased the vitamin-B_1 requirements. The need for thiamin was great, and the source was negligible. There is lack of evidence to support the influence of other avitaminosis on the amblyopia which these patients suffer.

Again, no attempt has been made to evaluate the significance of other possible contributing factors—dietary deficiency, intoxication, or circumstances of existence such as these men endured. Only under highly controlled circumstances could such a study be of definite value. Certainly these variable factors cannot be assessed in retrospect.

Discussion. Dr. Walter I. Lillie said that Dr. Beam, in presenting this series of cases and in describing typical, chronic retrobulbar neuritis with resulting simple optic atrophy due to vitamin-B deficiency, in sailors and marines who were prisoners of the Japanese, had definitely shown that they were actually due to the deficiency of vitamin B_1. Similar cases in the Army personnel had been seen by him at Valley Forge Military Hospital; so one could conclude that all branches of the service, under similar conditions, were similarly affected. One of the sailors noticed that, on the polished-rice diet, his vision diminished; but, when he was fed the unpolished rice, his vision would improve. He always made an effort to obtain as much unpolished rice as possible. Dr. Lillie warned that in treating debilitated conditions due to dietary insufficiency, one must be careful in using glucose intravenously. If it is not fortified with vitamin B, it will utilize the remaining vitamin B in the body tissues and produce an added deleterious effect.

Dr. Lillie complimented Dr. Beam on the excellency of his presentation.

A METHOD OF CLOSING THE CATARACT INCISION

DR. P. H. DECKER (by invitation) described a method of closing the cataract incision by sliding a large conjunctival flap from above down over a corneal scleral suture. He said that this conjunctival flap will temporarily bury the corneal-scleral suture and the entire line of limbus incision. About the fourth or fifth day, the conjunctival sutures spontaneously cut out, allowing the conjunctival flap to retract; thus automatically exposing the corneal-scleral suture which is removed about the 10th day.

The principles behind this procedure are: (1) the corneal-scleral suture gives adequate strength to the incision closure preventing vitreous loss; (2) the conjunctival flap gives an adequate sealing effect to the incision closure, allowing rapid and early reformation of the anterior chamber. Combining these two principles—the corneal-scleral suture and the large sliding conjunctival flap—gives two elements needed in cataract incision closure; namely, guarding against vitreous loss and against slow reformation in

the anterior chamber with its accompanying complications. A film showing the above operative procedure in six cases was presented.

Discussion. Dr. William Zentmayer said that, in looking up the literature for Dr. Decker, he had found that this procedure had been employed in cataract operations by Kuhnt.

Kuhnt makes a large conjunctival flap, as described by Dr. Decker, and, in addition, makes a horizontal incision well up in the cul-de-sac, which allows greater freedom in bringing down the flap and, therefore, better coverage of the wound than can be obtained without that incision.

Dr. Edmund B. Spaeth said that he had had the pleasure of seeing Dr. Decker's film with him at his home so that Dr. Decker knew, at least in part, what he was about to say for they had had a discussion at that time. It seemed to Dr. Spaeth that too much stress had been laid upon necessity for firm closure. Dr. Decker's two lateral sutures with the sliding conjunctival flap will give this under all but extraoardinary circumstances. At the same time, the conjunctival flap should seal off the anterior chamber. Dr. Spaeth agreed with Dr. Decker as to the necessity for closing the anterior chamber promptly. For years he had used the conjunctival flap closure on all cataract operations in one-eyed individuals. Nonformation of the anterior chamber, if it continues for more than two or three days, can cause serious consequences. Dr. Decker's beautiful film presents that, without any possible difference of opinion, in a most conclusive manner.

Dr. James S. Shipman said that he, also, would like to congratulate Dr. Decker on this beautiful presentation of a very interesting subject. From the pictures that had been shown he could not see the necessity for using any suture. The way those cataracts were delivered and the way Dr. Decker had his patient's eyes stay so still was beautiful to see. Dr. Shipman asked what kind of anesthesia had been used. In every cataract, that was shown, the operation was done very skillfully and with very little trauma. Certainly, so far as could be seen from the picture, there was no danger of immediate loss of vitreous.

The only excuse for a suture in these cases would be for the second reason—that of delayed closure of the anterior chamber. In Dr. Decker's technique, as nice as it was, Dr. Shipman did not once see where he replaced the iris pillars. What happens to these? Were the pupils dilated with atropine or homatropine? What drug was instilled at the first dressing? Was it atropine or not? These, are important points that have a great deal to do with the closure of the anterior chamber and, if the pillars are not replaced, they are going to be incarcerated to a certain degree and lead to a slow closure of the anterior chamber. Dr. Shipman said that he believed that there was no necessity for using atropine for the first dressing when there has been a good intracapsular extraction, as in all of these cases. Atropine is necessary in an extracapsular extraction where there is a lot of cortex, but, when a complete intracapsular extraction has been performed, there is no necessity for it. Certainly, there is no necessity for atropine until the anterior chamber has reformed and, in Dr. Shipman's experience, the major portion of them do reform within 24 to 48 hours after operation. He thought that a large conjunctival flap was a great help in getting the anterior chamber to reform and eliminated one of Dr. Decker's objections to cataract extraction without a suture; namely, the second objection—slow closure of the anterior chamber.

Dr. Shipman said that he had not come to believe that sutures were necessary for safe cataract surgery. He said that he

could do a better operation without them, and that he did not use them except on very rare occasions. He used one the preceding week in an eye that he knew had vitreous in the wound which was the result of a basal iridectomy. The man was a very poor patient, and his facial nerve was not blocked. Later, the lens had to be removed. Dr. Shipman felt that vitreous would present itself when he made the section. The iridectomy incision was enlarged slightly; then, three corneal-scleral sutures were inserted before the section was completed. In spite of this, vitreous was still seeping from the wound 10 days after extraction. Dr. Shipman said that he could not be convinced that corneal-scleral sutures or conjunctival sutures, as described by Dr. Spaeth in his discussion, would keep the vitreous in when it was going to come out. If vitreous is going to be lost, it will be, regardless of any suture. He still felt that a well-made corneal section, with a good conjunctival flap, was the best operation for cataract extraction.

Dr. P. H. Decker (closing) said that he wished to thank Dr. Shipman for his remarks, but he still felt sutures were necessary, at least in his hands. In regard to replacing the iris pillars, this was always done when there was any question of incarceration. He did not show this step in order to conserve film; however, he might add that he did not always insert an instrument into the anterior chamber after the extraction in order to replace an imaginary incarceration, as he felt that there was danger of inadvertently rupturing the hyaloid membrane by doing any unnecessary intraocular instrumentation after the extraction of the lens.

George F. J. Kelly,
Secretary.

NEW YORK SOCIETY FOR CLINICAL OPHTHALMOLOGY

January 7, 1946

Dr. Maurice L. Wieselthier, *presiding*

War surgery in ophthalmology

Dr. Sidney Fox said the title of his paper was correct only in so far as it applied to the eye center to which he was assigned. This was one of the nine eye centers set up when it became apparent, after the Normandy invasion, that the 65 general hospitals could not handle the large number of casualties. At the peak of activity 75 to 80 percent of the admissions were surgical cases. Later, about 50 percent were medical eye cases, half being nonspecific iridocyclitis; the others included optic atrophy, keratitis, and other metabolic disturbances in released prisoners of the Japanese. The first 500 operations performed in 1944 were divided as follows:

Defects (plastic repair)	235	47.0%
Secondary orbital implants	60	12.0%
Enucleations	47	9.4%
Cataracts	44	8.8%
Intraocular foreign bodies	27	5.4%
Muscles	25	5.0%
Glaucoma	15	3.0%
Retinal detachment	13	2.6%
Lacrimal operations	7	1.4%
Miscellaneous	27	5.4%

Operations after these 500 showed a greater proportion of plastic and lacrimal-sac operations. As a time-saving procedure for orbital implants, the use of purse-string sutures was abandoned, and two crossed-mattress, chromic sutures for Tenon's capsule with a running conjunctival silk suture were substituted with satisfactory results.

There were some senile cataracts, but most cataracts were traumatic and were usually removed by linear extraction. A

spatula, bent like a hook, was devised to slip under the iris to separate synechiae in the 11- to the 1-o'clock positions to eliminate the need for iridectomy in these cases.

Most intraocular foreign bodies were removed overseas. In the few cases which were seen, it was found that the giant magnet had little advantage over the hand magnet. The prognosis in these cases should be guarded, as in some eyes from which foreign bodies were successfully extracted with subsequent clearing, there occurred a late degeneration. A pars-plana approach was favored. In some of the cases, air was injected after the extraction but, in many of these cases, fibrous tissue resulted in multiple air pockets.

The traumatic-muscle cases were not operated upon until a year after the injury. Many of the squint operations were for strabismus present before entering the army. Many of the glaucoma cases were not the result of war trauma. Surface cyclodiathermy proved a satisfactory operative procedure. Ten of the 13 retinal-detachment operations listed were nontraumatic. A combined surface and penetrating diathermy operation was performed. Many of the patients had great damage to their lacrimal sacs, nasal, ethmoid, and lacrimal bones, and the number of these cases increased later in 1944 and in 1945. Lipiodol was injected to show the extent of the trauma. A large number of dacryocystorhinostomies were performed.

Possibly the most characteristic type of case resulted from burns after gasoline explosions in airplanes and tanks. Plastic repairs were required in these cases for loss of skin, shortening and loss of the eyelids, ectropion, and so forth. Powder burns were also common, and powder particles were found in tremendous numbers in the skin and eye.

To remove deeply embedded corneal foreign bodies a V-shaped incision was made in the cornea—the apex toward the center, the foreign body lying between the two arms—and a beveled flap was cut down from the apex. When the foreign body was approached, the flap was reflected, the foreign body removed, and the flap patted back in place. Only once was the cornea penetrated with loss of aqueous but with no adverse result.

Slides were presented illustrating the various types of cases.

Visual problems in aviation

Major Ernest A. Pinson (MC) said that associated with the operation of the Army Air Forces was the necessity for development of equipment which will measure or enhance certain visual functions used in flying. In certain instances, considerable research went into the development of such equipment to insure that it would serve the desired purpose when development was complete. Some of the equipment developed in the A.A.F. during the war years to solve certain problems relating to vision were: (1) The A.A.F.-Eastman Night Vision Tester for rapid testing and classification of large groups of flying personnel with respect to night vision. (2) The Radium-Plaque Night-Vision Tester, a small compact instrument which could be carried in a flight surgeon's kit, for testing at the squadron or group level. (3) Red goggles for wear in lighted ready rooms to keep the eyes of personnel dark adapted so that immediate efficient use of the eyes could be made outdoors at night; for example, in case of a hurried take off on an interceptor mission. (4) Anoxia demonstration charts to show flying personnel the reduction in visual efficiency at night due to anoxia, even at low altitudes, in case supplemental oxygen is not used on night flights. (5) Colored plastics for use

in blind flying training. This includes a combination of yellow or amber plastic over the windscreen plus blue-lensed goggles worn even in sunlight; whereas, the instructor who wears no blue goggles can see clearly through the yellow windscreen. (6) Special lenses for goggles and sun glasses. Amber lenses are used for haze penetration; graded-density lenses for scanning directly into the sun; rose-smoke lenses for glare protection and haze penetration.

Discussion. Dr. Howard Agatston said that Major Pinson's ingenious test for dark adaptation measures the degree and not the rate of adaptation. The time factor is not taken into consideration, and there is not always a high correlation between the degree and rate of dark adaptation.

Night blindness is a military medical problem from several standpoints. Shortly after the liberation of American soldiers from Nazi prison camps in April, 1945, it was noted that a large proportion of the men had nocturia and were unable to find their way to the latrines. Not having access to a biophotometer, 82 liberated soldiers were tested by exposing them to an X-ray viewing box for 10 minutes, then measuring the time it took for them to recover fully a 30-degree field either on a tangent screen or on a campimeter, in a dimly lit room. About 50 percent of this group, examined approximately one month after liberation, had prolonged adaptation times. Several malingerers showed normal rates of dark adaptation with concentric constriction of the field to 10 or 15 degrees, and there was little or no increase in the field taken in ordinary daylight. Perhaps the field of usefulness of Major Pinson's test could be widened by the addition of a time element and by its further adaptation for use in the diagnosis of malingering.

Major Pinson said that in a night-vision test, interest was in measuring the ability of the man to see under conditions which prevail at night. A good test must be correlated with this function. There is only a fair correlation between the rate of speed of dark adaptation and the terminal-rod threshold. The correlation between terminal-rod threshold and ability to see at night is very poor.

A satisfactory test for catching malingerers on dark-adaptation or night-vision tests has been developed. It depends on optokinetic nystagmus over which the examinee has no voluntary control. It has not been designed for field use but could be set up in a laboratory or hospital somewhat behind the front lines.

Experiences in the practice of ophthalmology in the army

Dr. Frederick H. Theodore said that in military ophthalmology routine classification work is of great importance. The military ophthalmologist tends to forget that different persons with the same refractive error may see differently without glasses, especially myopes. Furthermore, there is an unfortunate tendency, particularly among less experienced examiners under pressure, to call a soldier a malingerer without obtaining positive proof by means of malingering tests, just because no cause for the impairment of vision can be discovered. In this connection, the frequency of amblyopia of unknown origin should be emphasized. In a survey of 190,012 soldiers undertaken by the author and his coworkers, 10,532 were found to have impaired vision in at least one eye. In 23.82 percent or 2,509 of these men, poor vision had to be classified as of unexplained amblyopia.

Certain eye conditions that appear of minor significance in civilian life assume much greater importance in the Army, especially under field conditions. Outstanding among these conditions is night blindness. Cases of minor-degree night blindness, without obvious retinal find-

ings, are often disregarded. As a result, there may be malassignment of the individual soldier with serious consequence. Vernal catarrh is another condition which can become intolerable in warm climates. It is generally overlooked on induction. Hay fever falls in the same category. Men become sensitive to allergens that never bothered them clinically before.

Some eye conditions seem to be encountered more frequently in the Army than in civilian practice. These include primary, meningococcic conjunctivitis, nine cases of which Dr. Theodore had seen, and exudative choroiditis, which occurred in the younger soldiers. The importance of routine bacteriologic studies in acute conjunctivitis in the Army must be stressed. In heat stroke, retinal hemorrhages were seen in two cases. The local use of penicillin has resulted in so many allergies that its indiscriminate use is to be avoided.

In analyzing unpublished data concerning 41,000 men examined for aviation-cadet training, the inadequacy of the Howard-Dolman depth perception test was obvious. The value of routine screen and cover tests and testing of ocular motility was indicated by the uncovering of many cases of tropisms, otherwise overlooked and not picked up by routine photometer measurements.

Review of contributions of World War II to ophthalmology

Dr. Richard J. Hessberg pointed out that modern ammunition with its high explosive force produces extensive damage to eyes, orbit, face, skull, and brain; therefore eye injuries are often combined with head injuries.

All ophthalmologists recommend sending eye injuries to eye departments at rear hospitals as soon as possible. At the first-aid station, only cleaning and dressing should be done. Most of the eye injuries resulted from mine explosions. They produced perforating wounds with or without intraocular foreign bodies. Direct suture of corneal wounds is the method of choice. Only gaping perforations need conjunctival flaps. For the extraction of the foreign body a delay of 48 hours seemed to be less dangerous than lack of skilled care. Successful extraction is based on accurate localization with X ray. The multitude of foreign bodies and the overwhelming majority of small nonmagnetic ones made the posterior route the method of choice for the extraction of magnetic and nonmagnetic fragments. Severely damaged eyes should be enucleated with the least possible delay. Only in cases of purulent endophthalmitis is evisceration more advisable.

Blast effects are a new type of war injury due to detonation of high explosive bombs. The blast waves cause serious damage to the interior of the eye, rupture of the sclera, even complete loss of the globe.

Orbit and face were often injured, together with the eyes, by mine explosions. Important complications are injuries of nose and sinuses which menace the eyes and opening of the skull and which may be dangerous to life. Complete exenteration of the orbit and careful examination of nose and sinuses are necessary to protect the dura mater, if cerebro-spinal fluid is secreted from orbit or nose. An early spectacle-shaped hematoma of the lids is caused by multiple fractures of the orbit.

Severe burns of face and eyelids were produced by high explosive and incendiary bombs and by burning gasoline. The extensive defects of face, socket, and eyelids require skillful plastic reconstruction. The ophthalmologist doing reconstruction work has to choose the simplest procedure within the shortest time for the best restoration of form and function.

Discussion. Dr. Morris Davidson said that the New York Society for Clinical Ophthalmology ought to be congratulated

for starting this initial survey in the lessons of the war for the ophthalmologist and for the community. This was only the first installment of the survey of ophthalmic literature. The term "contributions," implying a constructive purpose, he felt should be discarded. Wars do not make any contributions to society. They only teach lessons.

Leon H. Ehrlich,
Secretary.

SOCIEDAD OFTALMOLOGICA DE MADRID

January 25, 1946

Subretinal cysticercus

Dr. Mario Esteban described a case of subretinal cysticercus (with presentation of patient). In this case, the first manifestation was an iridocyclitis. In the course of this condition it became possible to make out the presence of a subretinal cysticercus in the form of a smooth and transparent vesicle located in the infero-external sector.

The clinical aspect of the cysticercus was described, with discussion of the differential diagnosis of retinal detachment, choroidal tumor, and so on. As to treatment, surgical extraction must be attempted as early as possible, before the mechanical action of the presence of the cyst and the toxicoanaphylactic action of the parasite lead to greater changes in the eye, and before the cysticercus migrates into the vitreous, where its seizure would be more difficult and dangerous.

Discussion. Dr. G. Diaz García del Viso congratulated Dr. Esteban on his study, and referred to a case treated primarily with five or six sessions of radiotherapy without any change on the part either of the parasite or of the eye. The speaker had read later that radiotherapy had no action on cysticercus. Upon a suggestion by Dr. Basterra Santacruz, the cysticercus was killed by electrocoagulation, but after eight or ten days there began an iridocyclitis with hypopyon and marked pain, which made enucleation necessary.

The speaker agreed that the best treatment was surgical intervention with extraction of the parasite, in view of the certainty that even though diathermy killed the parasite it was sure to be followed by allergic reaction or by toxic action of the products of disintegration of the dead parasite.

Cystic formation in a pterygium

Dr. Marin Amat showed a clinical case of cystic formation in a pterygium, and another case of melanotic tumor of the iris. He would later make these cases the basis of other communications.

Foreign bodies of the orbit

Drs. M. Marin Amat and M. Marin Enciso stressed the importance of exact localization and interpretation of foreign bodies of the orbit (with projections). A patient with an extraocular foreign body of the orbit (from birdshot, while hunting), showed displacement of the radiographic shadow during movement of the eye, ecchymosis of the bulbar conjunctiva exactly corresponding with the wound of palpebral penetration, and hemorrhage into the vitreous. The authors called attention to the importance of differential diagnosis between intraocular and extraocular foreign bodies by means of good radiographic technique and perfect physiologic interpretation.

The symptoms were modified by the fact that the shot had glanced off of a stone, diminishing the force of penetration, and the shot remained incarcerated in the fibrous tissue of the adherent bor-

der of the upper lid, producing merely contusion of the eyeball and secondary hemorrhage. The patient had been looking down at the time of the injury. In the normal position of the open eye the foreign body would have lodged inside the orbit and would have escaped digital exploration. In lateral radiography in two exposures (looking up and looking down), the upper lid would follow the movements of the eyeball and thus produce a double shadow on the radiographic plate, instead of a single shadow. This, and a radiographic technique with the contact glass, would establish the true differential diagnosis.

Discussion. Dr. Gregorio Diaz Garcia del Viso said that, of the different methods of localization of intraocular foreign bodies, there are few which determine whether the foreign body is or is not intraocular so distinctly and conclusively as in the case presented by Drs. Marin Amat and Marin Enciso. Either of the methods described (contact glass, Casanova's ring, or that of Vater) are good and usually avoid uncertainty; but in other cases a distinction between extraocular and intraocular is difficult.

Closing, Dr. Marin Amat said that Comberg's contact-glass method was excellent, since the so-called geometric procedures, beside being complicated, required especial apparatus not always available. Injection of air into Tenon's capsule may mask the presence of the foreign body and is not always free from danger.

Considerations concerning lacrimation

Dr. García Miranda reviewed the various forms of therapy used for dealing with epiphora. He then insisted on the usefulness of dacryocystorhinostomy, which he considered the operation of choice in cases of dacryocystitis. There are, however, lesions of the canaliculi in which this operation cannot be performed for the very nature of the inflammation of the sac (tuberculosis and so on) contraindicates it. On the other hand, cases are encountered in which, in spite of the most perfect technique, the operation fails. In all such cases, having once eliminated lacrimal suppuration, the operation indicated is that of removing the lacrimal gland. The speaker has abandoned extirpation of the gland on account of the dry conjunctivitis which it produces. More recently he has used injections of alcohol, which, however, are inconstant in their action and have rather disagreeable consequences. Diathermocoagulation of the palpebral gland and of the excretory passages of the orbital portion is a harmless and often very successful operation. To avoid later dry keratoconjunctivitis, it is necessary to exclude those cases in which there exist conjunctival alterations of such a nature as to suggest failure of function of the accessory lacrimal glands, as found, for example, in trachoma. Also to be kept in mind are Sjøgren's syndrome (menopause, dryness of the mucosas, rheumatic troubles, and so on). Discussion by Drs. Marin Amat and Esteban.

Dr. William H. Crisp,
Translator.

SOCIEDAD OFTALMOLOGICA DE MADRID

Scientific Session

February 22, 1946

Nevus flammeus and glaucoma

Dr. Casero (from the Clinic of Prof. García Miranda) said that it is interesting that localization of nevus follows the distribution of the branches of the sensory nerves, that is of the nerves of vegetative life. There are two types: (1) The type in which the nevus is accompanied

by late appearance of a simple glaucoma; (2) the type in which the nevus, from birth, accompanies hydrophthalmos. As regards the cases with glaucoma, these are now regarded as due to telangiectasis in the ocular fundus, especially the choroid; although existence of a nervous factor cannot be excluded. The radiologic appearance of this condition was described by Weber in 1923, including the appearance of parallel curved lines of calcification corresponding to images of the cerebral convolutions, with deposits of lime in the boundary between the gray matter and the white matter. The speaker described a case of nevus flammeus of the first branch of the trigeminus of the left side, with ocular hypertension of 60 mm. Hg reduced to 45 mm. under pilocarpine. The disc was atrophic but did not show glaucomatous excavation. The peripheral field was normal but there was an absolute central scotoma. There were changes in the pyramidal tracts of the brain and also a slight mental debility. There were dilatations of the vessels of the diploe, without Weber's calcifications.

The discussion was led by Drs. Mario Esteban, Marin Amat, and García Miranda.

Congenital ectropion of the uvea

Dr. Barahona (from the Clinic of Prof. García Miranda) described such a case in a girl, aged eight years. The ectropion covered a large part of the iris stroma. As seen under the slitlamp, the iris was perfectly formed, reacted normally to light and convergence, and the eye showed otherwise no anatomic or functional anomaly.

Discussion. Dr. Mario Estaban called attention to differential diagnosis from heterochromia or pigmented nevus of the iris.

Ocular lesions from volatile solvents

Dr. García Miranda described the danger to the eye in occupations apparently harmless, with especial emphasis on ocular lesions from volatile solvents. These substances have metallic action, are irritating to skin and mucosa, and have specific action on the liver, the kidney, the heart, the blood, and the nervous system. In the course of industrial development, such substances are used to a remarkable degree in the making of lacquer for furniture, leather, shoes, artificial silks and gems, in the cleaning of various articles of wear, and in various parasiticides.

In cases of retrobulbar neuritis, the cause of which cannot be determined, it is to be remembered that central scotoma with a variable ophthalmoscopic picture may be the only clinical expression of poisoning by one of these preparations. The speaker's comments were based upon a case in which the left eye showed a postneuritic optic atrophy and the right eye a simple atrophy with a final picture of retrobulbar neuritis. The patient had worked for 23 years with one such product known as "rudol Michelin." Most persistent clinical investigation did not show any other etiology than presumed intoxication by such a substance. Discussion by Dr. Mario Estaban, with special regard to industrial compensation.

Dr. William H. Crisp,
Translator.

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THE HEED OPHTHALMIC FOUNDATION

A generously endowed trust fund has recently been established by Mr. and Mrs. Thomas Heed of Chicago. Its purpose is to provide fellowships to qualified individuals who have completed their residencies in Ophthalmology, in order that they may continue their advanced studies primarily in ophthalmic surgery. The conditions are liberal and there are very few restrictions. The successful applicant, or applicants, will be chosen by a board of directors composed of five ophthalmologists. He will hold the fellowship for a year, or longer if the board is so inclined. The fellowship is limited to American citizens for training in the United States of America. One or more fellowships, depending on the applicants and the availability of places suitable for such advanced training, will be granted each year, at the discretion of the board. The secretary is Dr. M. Hayward Post of Saint Louis.

The creators of the fellowship have rendered a great service to ophthalmology and to the people. The training of an expert ophthalmologist is one of great responsibility and importance. It requires time, experience, and material. Many ophthalmologists are doing eye surgery, but there are relatively few who are outstanding in this meticulous field. There is far too much surgery of mediocre quality being done. This is, for the most part, the result of poor training and lack of opportunity. Many a promising ophthalmic surgeon has had to go into practice at the end of his residency, by force of necessity. He has had to achieve skill and proficiency the hard way, sometimes at a cost to his patients.

A year of further, advanced training under the watchful and paternal eye of a master, or number of masters, cannot help but be beneficial to the public and to ophthalmology. The time spent in the working out of particular surgical problems, research in techniques, observation, the assisting at and the performing of various operations under the direction of a preceptor cannot but be fruitful. To work, free of economic worry and pressure, with men who are outstanding in this field is an opportunity that is superb and without price.

There is a danger that this training might interfere with that of the resident and stifle his chances. This need not be so if the matter is carefully thought out and planned. Much depends on the preceptor and the inspiration that he gives to the Fellow, as well as to the opportunities that are at hand. The members of the board of directors who are experienced surgeons and teachers can be trusted to work out this problem satisfactorily to all concerned. In fact, the resident should benefit considerably by association with the Fellow; each could be of assistance to the other in the surgical workshop.

It may be said, too, that there is a scarcity of clinical material upon which to work and learn. This may be true in most places in so far as the numbers of patients are concerned, but teachers of ophthalmic surgery agree that it is quality and not quantity of workmanship that counts. If talented, one can become a safe, and perhaps excellent, cataract surgeon after the performance of 25 or so cataract operations done the right way. It also holds true that 100 operations done with little or no supervision, especially by a bungler, will leave the cataract surgeon no further along, except for a trail of more or less mutilated eyes behind him. The brutal German saying that "one can only become a surgeon after spoiling a hatful of eyes" is a false one.

Like other fields of endeavor where skill, training, artistry, and "the touch" count, ophthalmic surgery requires much of the man who would excel. He not only must be peculiarly endowed by nature with talent; he must also be inspired by example. He must have a good eye and a steady hand. He must be bold, yet tender. He must have the courage of a tiger and the touch of a butterfly. Above all he must have judgment.

He must develop versatility. There are many violinists but only one Heifetz. There are many fiddlers who can play nearly every piece of music fairly well in the first three positions, but none of these become violinists without further study, training, and practice. Exceptionally few develop the versatility required of a master of the art. There are many ophthalmologists who can do a good cataract operation provided everything goes well, but the possessor of versatility in cataract surgery has saved many an eye that, in lesser hands, would have ended in disaster. It is the function of a good teacher to teach and develop this art in the pupil. It is this type of training in the post-

residential stage that should be emphasized.

There are a number of foundations designed to take care of the patient after he becomes blind, even as the result of poor surgery. The Heed Ophthalmic Foundation is the first, however, planned against a specific source of blindness. In fact, it can be called a "Foundation to Prevent Surgical Blindness." For their generosity in providing the means to elevate the standards of surgical training and to further the development of surgical skills, the Heeds deserve the gratitude of all ophthalmologists.

Derrick Vail.

INSTRUCTION IN OPHTHALMOLOGY BY OPHTHALMOLOGISTS TO NONMEDICAL GROUPS

There has long been a difference of opinion as to whether or not the ophthalmologist would serve the public better by giving instruction to those who specialize in care of the eyes but who have not had the medical training that would qualify them to practice medicine.

The arguments pro and con are for the most part too obvious to need more than mention. On the "pro" side it is almost universally agreed that there will be a continuing use for the refractionist who has not qualified for the practice of medicine or surgery. For everyone who plans to perform refraction to have surgical training is absurd. Three fourths would have wasted their time because there is not now, and never will be, enough surgery for them all to become or remain qualified. Nevertheless, everyone who performs refraction should have a good medical background. Whether this is obtained by improving this part of the teaching in the independent schools of optometry or by associating them with medical schools, as is now the tendency, is another subject for discussion.

On the "con" side are such arguments as that these nonmedical refractionists will never have sufficient insight into the medical factors involved in refraction and that a full medical and surgical training such as is required by accredited medical schools is essential for intelligent ocular examination. The point is made that, with insufficient medical training, these refractionists invade further and further the medical field and that lectures and instruction by ophthalmologists can never be adequate. Furthermore, those on the "con" side contend that lecturing in optometric colleges gives recognition to nonmedical refractionists that ophthalmologists should not encourage.

The heated and prolonged controversy over the optometric resolutions of the Section on Ophthalmology of the American Medical Association testifies to the difference of opinion on the entire subject. Realizing that this is so and recalling the previous difficulties about the resolutions earlier passed by the Section, the "Pros," in order to liberalize ophthalmo-optometric relations to some degree, introduced the following resolution at the Section meeting in San Francisco in July: "Whereas, It is not contrary to the Principles of Medical Ethics as determined by the American Medical Association for members of the Association to disseminate information pertaining to matters of public health, such as cancer, diabetes, and venereal disease, by lectures, demonstrations, radio talks, pamphlets and conferences or other means to non-medical groups; and Whereas, Ophthalmic subjects, such as vascular disease, glaucoma, retinal disorders and optic nerve disease, considered as potential causes of blindness are matters of grave importance to the public; and Whereas, The prevention of blindness is one of the chief obligations of

ophthalmologists; therefore, be it Resolved, That the Section on Ophthalmology of the American Medical Association declares that it is entirely within the definition of medical ethics for its members to engage in lectures, demonstrations, the preparation of pamphlets and other measures suitable for the dissemination of information designed to prevent blindness and directed to any non-medical group."

This was passed unanimously and should be adopted when presented to the House of Delegates at its next session. What are the implications of this action of the Section in recognizing the value of permitting the ophthalmologist to give lectures to optometrists? Fundamentally, the resolution recognized the optometrist as a part of the visual program and that, as such, the better informed he is, the better it will be for the public. This goes even further and carries a deeper implication than this and one with which ophthalmologists may not agree. This is the recognition of optometry as a useful and honorable specialty. Why plan otherwise to help its members?

To fail to recognize optometry as an entity is sheer wishful thinking on the part of some ophthalmologists. The hostile attitude between the two groups is detrimental to each and above all to the public that is confused by the repercussions of the conflict. An understanding between the two is long overdue and this would probably have taken place years ago had ophthalmologists been permitted by medical ethics to confer freely with optometrists.

The aforementioned resolution when passed by the Trustees will go a little way toward breaking down the barriers, and free discussions, when possible, may help to delimit the fields of activities of oculists and optometrists. The resolution does not go far enough, but may do something to encourage better relationships.

Most optometrists want to refer as few patients as possible to eye doctors because eye physicians seldom refer patients to them and are sometimes remiss in sending the referred patients back to the optometrist. For this and other reasons, many optometrists wish themselves to conduct, whenever possible, the ophthalmic care of the patient and to consult directly with the internist; for example, in cases of diabetes, retinitis, and brain tumors. Optometrists hope to perfect themselves in diagnosis and many want to give orthoptic training. Most ophthalmologists believe that the optometrists' lack of a broad medical education prevents their having sufficient background to render them competent in the making of diagnoses. The difficulty of doing so is recognized by optometrists, and their leaders are constantly attempting to raise optometric educational standards. It is not inconceivable that their own demands will force such educational requirements in their group and that two or more years of medical training will be insisted on by them for optometric degrees. It may not be, and probably should not be, the same as that required of those who plan to practice in the medical or surgical fields of ophthalmology, but might well be broad enough to enable those who graduate from such schools to perform satisfactorily such functions as most optometrists wish to perform. In that case, the number of oculists may diminish, but this in itself may not hurt the public weal if the work is well done by others.

In brief, many optometrists desire to perform refractions, make fundus examinations, test visual fields, give orthoptic training, fit contact lenses, serve as consultants for medical practitioners, and to attain medical recognition of the title "Doctor." Some would eliminate ophthalmologists from all of the visual fields except the surgery and medical treatment.

The extreme ophthalmic point of view would be the elimination of optometrists from all fields and, on the other hand, no ophthalmologist would accept all of the suggestions of the most radical optometrists. Put in that light, the differences might seem insurmountable, but fortunately in our democratic state there is a certain amount of give and take and a willingness to see the other fellow's point of view. Some compromise in these visual matters is essential to public welfare.

The first step necessary is to make it possible for ophthalmologists to confer with optometrists without criticism. From there on, matters should not be too difficult. Leaders of both groups should meet without animosity, in friendliness, and on an equal footing and, bearing in mind primarily the visual welfare of the public, should iron out their differences. Naturally it will take a long time to eliminate all of the points of disagreement, but even this is possible and to make a good start in the right direction should not be hard. Most important is the point that coming to agreement is not a may, but a must!

Lawrence T. Post.

BOOK REVIEWS

HARVEY CUSHING, A BIOGRAPHY. By John F. Fulton. Springfield, Illinois, Charles C Thomas, 1946. 722 pages, 150 illustrations, index. Price, $5.00.

John F. Fulton, Sterling Professor of Physiology, Yale University, whose versatility matches that of his subject, has produced herewith a brilliant volume of biography that glows with admiration and affection for one of the greatest figures in medicine and surgery of all times. That this has been a labor of love and creative joy is obvious at the first thumbing of the book. Although an intimate friend of "the Chief," a close companion on many a famous occasion, and the literary executor of the Master, Fulton has written this splendid and vital work as objectively as was humanly possible for him to do. Throughout the book he refers to himself as "a friend" who said this or observed that, copying intentionally Cushing's own biographical method in writing the great *Life of Sir William Osler*. One cannot help but wonder whom J.F.F. has chosen to be his own literary executor and biographer, for surely the tradition that produced such magnificent biographies as "Osler" and now "Cushing" must be perpetuated and the torch handed on.

There are many physicians, surgeons, neurosurgeons, neurologists, and even ophthalmologists, for we honored H.C. (as Fulton calls him) by giving him the Herman Knapp medal from the Section on Ophthalmology of the A.M.A., in 1929, for his paper on the meningiomas that he presented before the Section, who will read this volume with great pleasure and profit. There will be countless medical students, house officers, residents, and internes who will try to take it apart to see what made the man tick, and some may even try to do back somersaults from hospital entrances throughout the world in emulation of the great man, trusting that some photographer may be present to snap the act for posterity.

It is not known whether or not Cushing was ever "analyzed" by a psychiatrist friend or foe to discover the driving force of his vital personality. He was fortunate in the choice of his forefathers, particularly so in his parents, for his father, made of stern stuff, still paid the freight of his extraordinary son until long past the usual age of paternal financial subsidy. Did he realize in some prophetic fashion just what his son would do in life? Most doctor fathers of doctor sons want them to return as soon as training is over to help the old man in his work and speed

his retirement. Not so Dr. Henry Kirke Cushing, for if there were any parental objections to the long training program, the biographer does not make it clear.

A man of H.C.'s dynamic drive, ego, personality, and character could not but make enemies, most of whom were jealous perhaps, behind him in his march to the peak. He knew what he wanted and set out to get it, seizing the opportunities as they presented and squeezing the last ounce of juice from the fruit. His ruthlessness is lightly mentioned in the biography, but those who knew and recall him vividly to mind know how merciless he could be at times toward friend and foe alike.

The author of this review sat at his feet as a medical student and recalls many an occasion when this unpleasant trait of ruthlessness revealed itself in the class room and operating theater. H.C. was a man possessed by a demon of perfectionism. His class-room humor could be and often was sardonic and sarcastic. He drove the students to despair in his quizzes by his remarks. Even his nephew Pat was not spared these quips, and H.C. would turn on him like a tiger when the perfect answer was not forthcoming, as it almost never was from any of us. On other rare occasions, particularly when he was discussing and showing some of his collection of old medical books, all was sweetness and light, good humor and kindliness. We did not know until after graduation what a great man this little devil really was, and perhaps it was presumptuous of us to expect anything else, worms that we were, but verbal scourgings and tongue lashings for our collossal and abysmal ignorance. But we learned much from this man and are grateful to have touched the hem of his operating gown in passing.

His iron character revealed itself most strikingly when, informed of his eldest son's tragic death in a motor accident, he made the necessary arrangements by telephone for the bringing home of the body, and then went into the operating room where he calmly did a tedious and painstaking brain operation. Did his hand shake, or his heart turn sick, or his respiration increase, or his spirit falter? No one knows.

He was fortunate in the devotion of his wife who coped with his drive in life and surrounded him with every protective device she could, as if realizing that he did not belong to her or the children but to the world itself. One wishes that the author of the biography had devoted more space to the drama of this Spartan widow and her tribulations as wife of a genius.

There is much in the book of ophthalmic interest, particularly one gem. When on a visit to Lyons in 1900, H.C. called on Louis Dor. He said in his diary: "Dor is an ophthalmologist but such a one as the following description will relate. He took me to see a patient who had lost his cornea and ant. chamber from a hot iron. The man came to Dor after 8 days just as the slough had separated. The lens fell out and iris was prolapsed. Dor replaced them, covered the wound with a graft of a rabbit's whole cornea which he sewed in place and covered with one of the thin glass arrangements for astigmatic eyes. I saw the man 8 days after this—graft taken—slightly opaque. Probably will have vision." Did the graft really take? There is doubt about that for ophthalmic literature is silent, as far as I know, about this remarkable case. Had this operation taken place in the United States in the year 1946, the newspapers would have told us everything except the end results too, you can be sure.

In 1911 Cushing "persuaded Clifford Walker of the present graduating class (at Hopkins) to stay and work on ophthalmological problems in the Hunterian Laboratory and in the hospital next year. I

hope he will make good." Walker did make good with Cushing as is well-known, for when the latter moved on to Harvard he took Walker with him and used him to study the perimetric deviations in brain-tumor lesions particularly those of the pituitary. Clifford Walker remained with him for some time and then moved out to the West Coast returning periodically to the Brigham Hospital to check, at H.C.'s request, the perimetric procedures. One wonders why Walker left and why he discontinued to a large extent his interest in perimetry, unless it was his great absorption in the problem of retinal detachment. Incidentally, Walker rendered an unconscious disservice to ophthalmology, for Cushing, and his pupils and his followers, seldom, if ever, relied on an ophthalmologist's perimetry, preferring to do it themselves, even to this day. Surely, there were ophthalmologists in Boston capable of taking an accurate field of vision, sparing Walker a long trek East. This is a curious thing, and not even hinted at in the biography. Is there an untold story here of animosity to Boston ophthalmologists? I think it to be but another manifestation of the perfectionist wanting control over everything that related in any way to his field, and jealously guarding his prerogative.

This book has given such pleasure in its reading that one is reluctant to put it down for within its pages are revealed the life's activities of a man of his own time, who made his own time through hours and hours of meticulous, painful work in the library, laboratory, wards, and operating room. He seized Time by the forelock and made him do his bidding. With malevolent and dictatorial charm he wove the fabric of his long life into a cloth of gold of priceless worth. His keen eye, skilled hand, and trained brain founded a new school of surgery. His influence will be ever felt, like the visible light of a star that perished thousands of years ago. This little man of steel sinews possessed such vital force that the storms of nature and human ills buffeted against him in vain until the very end. His life belongs to the world and to humanity and we have much to learn from him. We are grateful for the glimpse of an epic life that J.F.F. has so skillfully given us.

Derrick Vail.

WHY PUPILS FAIL IN READING. By Helen M. Robinson, Director of the Reading Clinic, University of Chicago. University of Chicago Press, 1946. Price, $3.00.

Approximately the first half of this book is a comprehensive review of the literature. It is unfortunate that the author was unable to include the more recent publications, probably due to the difficulty and delay in getting material published immediately.

The remainder of the book deals with the findings which are present in 30 selected cases of reading difficulties. An extensive investigation was made by various specialists in their respective fields to include psychometric and educational examinations, social history, psychiatric studies, pediatric examinations, neurologic examinations, visual examinations, examinations of hearing, speech examinations, and endocrine examinations.

In conferences after evaluating and correlating the findings, the patients were classified by the way of a summary: (1) Anomalies found by the individual examiners. (2) Factors considered important by the group. (3) Probable cause.

The general approach in the remedial work was to begin with the symptoms which were considered as the primary causes and postpone the attempt to correct the various other factors as presented. Unfortunately, due to circumstances be-

yond control, the author was unable to make a complete analysis of many of her cases. It was therefore impossible to demonstrate the growth curve of the entire group. As demonstrated in many of the cases, it was difficult to get satisfactory results by treating only one factor which was considered to be the primary cause, rather than by treating concurrently the entire group of symptoms as presented.

In general, this thorough piece of work on the problem of reading difficulties, like all similar work, opens more problems than it solves. This book should be available to all persons interested in the problem of reading difficulties.

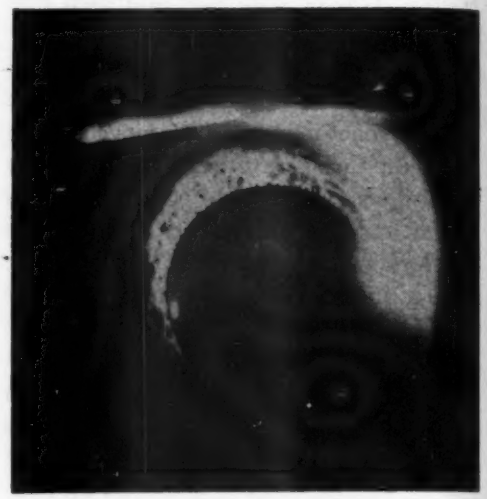
George E. Park.

CORRESPONDENCE

CONTUSION CATARACT OF THE ANTERIOR LENS CAPSULE

Editor,
American Journal of Ophthalmology:

I have just read Dr. Herbert F. Sudranski's interesting paper upon "Contusion Cataract of the Anterior Lens Capsule" (*American Journal of Ophthalmology*, 1946, volume 29, October, page 1281). His explanation of this "new" form of cataract is very intriguing, but I am afraid that this exhaustive study in intraocular dynamics is quite out of order since there is no doubt whatsoever, either from the description or from the photograph, that he is dealing with the extremely characteristic "Sunflower of Chalcosis Lentis," or the so called "Sonnenblumstar." The photograph is so typical that I am enclosing one of my own—a typical sunflower cataract, in order to accentuate the resemblance. Furthermore, I wish to refer to an article written in the Archives of Ophthalmology, 1944, volume 32, July, pages 63-65, in which this type of lens opacity was photographed. In this article the technique of photography for such a cataract was described and, since the article dealt with "Chalcosis Lentis," such a



(Rosen). A typical sunflower cataract.

possibility should have occurred to the author.

It would appear that some retraction of the statement, "This lenticular opacity appears to be a unique variety of traumatic cataract not yet reported in the ophthalmic literature," is in order for this lens change is far from "unique."

Once having assumed that this is the sunflower cataract of Copper, it is not difficult to understand: (a) the biomicroscopic picture—that is, "complete reproduction of the circular sphincter muscle fibers and the radial pattern of the iris—on the anterior capsule of the lens—in faint, grayish-white markings," (b) the vitreous disorganization, (c) future course of the foreign body.

I trust that this brief note will be of some small value in maintaining the high caliber of the Journal and at the same time will be of some value to those young men who have not been fortunate enough to observe the "sunflower cataract" under the slitlamp.

(Signed) E. Rosen,
Newark, New Jersey.

Editor,
American Journal of Ophthalmology:

The photograph (minus data) sent to you by Dr. Rosen of Newark, New Jersey is, indeed, striking in its likeness to my case of contusion cataract recently published in the Journal. I am, however, unable to agree with Dr. Rosen that my case is actually one of sunflower cataract due to chalcosis.

Dr. Rosen referred to an article published in the Archives of Ophthalmology, July, 1944, which proved to be a case report of chalcosis authored by Dr. Rosen. The illustration of the sunflower cataract in that case bears only superficial resemblance both to the photograph sent to you by Dr. Rosen and to my own case. The first footnote in this article refers to a publication by Cordes and Harrington in the Journal, 1935, volume 18, page 348, which gives the following description of the typical sunflower cataract of chalcosis:

"The characteristic picture of chalcosis, as a rule, begins to appear several years after the introduction of the foreign body. There is present on the lens a disciform opacity occupying the pupillary area. It is greenish gray in color and rather metallic in appearance. In marked cases, the color may be a definite green. The edges of the ring are often serrated, with lines radiating to the periphery of the lens."

In his reported case, Dr. Rosen described the cataract as "bluish green" or "aquamarine" in color. Such descriptions of the sunflower cataract of chalcosis that I have been able to find, similarly describe it as discoid in shape and of metallic color. Furthermore, chalcosis is found almost exclusively in cases of accidents involving ammunition (as in Dr. Rosen's case), and the development of chalcosis is concomitant with absorption of the foreign body.

My case of contusion cataract showed no evidence of a foreign body of copper. It was not a case involving an accident with ammunition. There was X-ray evidence that absorption of the foreign particles had not occurred. The cataract, upon the anterior lens capsule, in neither shape nor color, resembled the classic description of the sunflower cataract of chalcosis. There was no evidence of chalcosis of the cornea or other degenerative change due to the toxic effects of copper.

While I am unable to concur with Dr. Rosen's opinion of the significance of my case, I am deeply grateful for his having called to my attention a second case of contusion cataract, for surely a penetrating injury of the eyeball with a foreign body of copper should prove to be as efficient as any other in effecting such a lesion of the anterior lens capsule.

(Signed) Herbert F. Sudranski,
Indianapolis, Indiana.

LESLIE DANA MEDAL*

Presentation to Harry S. Gradle, M.D.

by

Conrad Berens, M.D.

Mr. Chairman and Friends of Harry Gradle:

It is particularly fitting that the Saint Louis Society for the Prevention of Blindness should have selected the time of a meeting of the American Academy of Ophthalmology and Otolaryngology for the presentation of the Leslie Dana Gold Medal for outstanding work in the cause of preventing blindness. In the first place, every woman and man here not only is a friend of Harry Gradle but loves him because of respect for him personally and in appreciation of his work and his numerous activities, most of which had Prevention of Blindness implications.

Dr. Gradle or "Harry," as he is affectionately called by every member of the Academy, has been indefatigable in his work for this Society, and the postgraduate educational program and the Home Study Course have been important factors in educating ophthalmologists in this and other countries. His constant efforts to educate ophthalmologists have added new methods of prevention and treatment of eye disorders which undoubtedly have prevented much blindness.

Because of his researches, his writings, his teachings, his organization of the Pan-American Association of Ophthalmology, his imagination, and stimulating influence in conducting the affairs of his many activities, he has been a great leader in the Prevention of Blindness movement. No ophthalmologist today more richly deserves the honor of being awarded the Leslie Dana Medal. It is my privilege, on behalf of the Saint Louis Society for the Prevention of Blindness and The Association for Research in Ophthalmology, to present the Leslie Dana Gold Medal for the Prevention of Blindness to Dr. Harry S. Gradle. In his absence, because of illness, the medal will be received by Mrs. Audrey Hayden Gradle, who is equally outstanding in Prevention of Blindness activities. May I read the inscription?

"Let the light remain to Harry S. Gradle, distinguished ophthalmologist and teacher, ardent worker for saving sight."

Mrs. Gradle, will you take this medal to your husband with our deep love and fondest wishes for his speedy recovery?

* Presented at 1946 Chicago meeting of the American Academy of Ophthalmology and Otolaryngology.

ABSTRACT DEPARTMENT

EDITED BY DR. F. HERBERT HAESSLER

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is mentioned only in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy, embryology, and comparative ophthalmology

9

CRYSTALLINE LENS

Orr, H. C. **Ray Cataracts.** Trans. Ophth. Soc. U. Kingdom, 1944, v. 64, pp. 249-252.

Ray cataract, a term applied to lenticular opacities commencing in the posterior layers of the lens include the cataracts of glass blowers, puddlers, chain workers and those induced by ultraviolet and infrared rays, Roentgen rays, radium, lightning, and electric flash.

The author quotes Butler who stated that "the presence of lenticular opacities and of reduplication of the posterior capsule are not in themselves pathognomonic of glassblowers' cataract, but when, in addition, the slitlamp shows some detachment of the zonular lamella then the surgeon may go into the witness box and swear that the condition present is due to heat radiation and to no other cause." The incidence of the disease is less than it was 25 years ago owing to improved methods of work.

Such a cataract may develop within three months after operation for detached retina when the diathermy point has been placed less than 13 mm. from the limbus. Presumably degenerative changes in the ciliary body induced by heat interfere with the nutrition of the lens capsule. Beulah Cushman.

Pignalosa, Giuseppe. **The oxidation of some fatty acids and esters of fatty acids from the lens of guinea pigs on scorbutigenous diet.** Boll. d'Ocul., 1944, v. 23, Oct.-Dec., pp. 243-256.

In 63 percent of guinea pigs kept on such a diet for 18 to 23 days, small punctiform anterior or posterior cortical or perinuclear opacities appear. These lenses can oxidize fatty acids or esters like many other tissues can. (Bibliography.) Melchior Lombardo.

Poyales, A. **The Smith operation.** Arch. de la Soc. Oft. Hisp.-Amer., 1945, v. 5, June, pp. 456-464.

Poyales believes that the Smith technic is being unjustly discarded, and that it has definite advantages in selected cases. The technic is described in detail, and intumescent cataract considered its chief indication. It is con-

traindicated in high myopia, and in small cataracts in old people, in whom the eye becomes very soft after the section. In contradistinction to other methods of cataract extraction, marked hypotension is not desirable with this technic. The author attributes complications to faulty technic.

Ray K. Daily.

Poyales, A. **A modification of the Smith operation.** Arch. de la Soc. Oft. Hisp.-Amer., 1945, v. 5, June, pp. 464-466.

The modification consists in delivery of the lens without tumbling. Poyales compares this delivery of the lens to the escape of a cherry kernel, when the cherry is squeezed by the fingers. The role of the fingers is exercised by a hook and the posterior lip of the incision. The hook is applied at the lower third of the cornea, and pressure exerted upwards and backwards, at an angle of 45 degrees with the optic axis. Poyales insists on extraction of the capsule after the lens has been delivered extracapsularly because of accidental rupture of the capsule. Considering the state of opacification in which lenses are extracted today, an extracapsular extraction is, according to Poyales, a surgical absurdity.

Ray K. Daily.

Reynolds, J. S. **Cataract extraction under sodium pentothal.** Minnesota Med., 1946, v. 29, July, p. 700.

The author reports 100 consecutive cataract extractions under sodium pentothal without any unsatisfactory results. The eye is very much at ease, there is good lid relaxation, lid retraction is perfect, and there is no need for conversation with the patient. Dilation of the pupil is almost complete. The patient is quiet when he leaves the operating room and remains so from one half to four or five hours.

John B. Hitz.

Ribeiro, Rufino. **The history of aspiration in cataract extraction.** Arch. de la Soc. Oft. Hisp.-Amer., 1945, v. 5, June, pp. 434-447.

Ribeiro traces the application of suction in cataract extraction from Tsabet Ben Gorra, who lived in Irak in the ninth century to Barraquer's modern procedure. For successful application of the modern instrument the size of the suction cup and the degree of vacuum should be individualized according to the hardness of the lens, the size of the pupil, and the resistance of the zonule. Obviously the same cup with a set vacuum is not suitable for all types of cataract. The harder the cataract the smaller should be the cup and the greater the suction. The soft intumescent lens requires a cup with a large surface and low degree of suction. In order to avoid dislocating the lens care should be taken that the cup is firmly applied to the lens surface before suction is initiated. Suction should be abandoned at the slightest appearance of vitreous. To loosen the attachment between the lens and the hyaloid the lens should be rotated about its horizontal meridian, as advocated by the Greens. The delivery of the lens should be assisted by Smith's maneuver with a forceps applied at the lower limbus, and advanced over the cornea, so that when the lens is completely delivered the corneal flap is in its place and the wound is closed. Ray K. Daily.

Samuels, B. **Cataract associated with intraocular tumors.** Arch. of Ophth., 1946, v. 35, April, pp. 366-383.

The condition of the lens is described in a study of 57 globes containing intraocular tumors, 34 malignant melanomas, 21 retinoblastomas and one each of epithelioma of the ciliary body and of sarcoma. Folds of the lens capsule were infrequent, possibly because most of the globes were glaucomatous. Proliferation of the lens capsule was not a characteristic but there were instances in which the restricted proliferation showed unusual features. Necrosis of the subcapsular epithelium was observed in malignant melanomas along with necrosis of the tumor. This change was a rarity in retinoblastoma. Direct contact of the tumor with the lens seldom interfered with the transparency of the lens nor was dislocation a feature. Cataractous changes were frequently noted in the anterior and posterior cortex whereas the equator was less often affected. Calcification of the lens substance was observed in three cases of retinoblastoma. Other less striking features are discussed as well as aspects of clinical diagnosis of tumors associated with cataracts. (16 illustrations.) John C. Long.

Sasiain, M. R. **The metabolism of the lens.** Arch. de la Soc. Oft. Hisp-Amer., 1945, v. 5, April, pp. 273-287.

The author reviews the literature and gives the following summary: The metabolism of the lens takes place through an electrotonic interchange in an anoxibiosis. The catalytic enzymes and the systems of oxyreduction are indispensable for the metabolism of the lens. Transparency of the lens and accommodation the the two principal functions dependent on the lens metabolism. To maintain normal lenticular transparency and accommodation the reduction power of the lens has to reach and maintain a certain level. If the metabolic harmony of the lenticular constituents is lost, they precipitate, causing opacification of the lens.

Ray K. Daily.

Sedan, J., and Sedan-Baubys, J. **Preliminary micropuncture in certain cataracts.** Ann. d'Ocul., 1946, v. 179, no. 1, pp. 35-40.

In milky cataracts and in some other types in which the capsule cannot be easily grasped with capsule forceps, a peripheral iridectomy is performed. The upper periphery of the lens is punctured as near the equator as possible with a fine needle. A small amount of milky lens matter exudes which facilitates grasping of the capsule with smooth capsule forceps preparatory to removal of the lens in its capsule.

Charles A. Bahn.

10

RETINA AND VITREOUS

Amat, M. M., and Enciso, M. M. **External exudative retinitis, or Coats' Disease.** Arch. de la Soc. Oft. Hisp.-Amer., 1945, v. 5, Aug., pp. 623-630.

The authors describe the left eye of an 8-year-old girl, that had typical changes at the posterior pole as well as peripheral angiomas mostly in the inferior temporal portion of the retina. The general examination was negative, except for an eosinophilia of 6 percent. The literature on the pathogenesis of the affection is reviewed, and it is pointed out that neither Leber's theory of fibrinous exudation with subsequent degeneration of retinal tissue, caused by toxins that arise in small microbian emboli of low virulence, nor the modern conception of an endocrine disturbance that affects the permeability

of the capillary endothelium have any experimental support. (2 colored illustrations.) Ray K. Daily.

Azzolini, U., and Longo, P. **Tortuosity of the retinal vessels considered as a part of a general vascular malformation (Hamartosis vascularis diffusa).** Riv. di Oftalm, 1946, v. 1, p. 35-51.

The authors review numerous case reports from the literature and add one of their own to show that tortuosity of the retinal vessels may be considered as a part of a general vascular anomaly. The name hamartosis vascularis diffusa is proposed (from the Greek hamartanein, to miss). Albrecht coined the term hamartoma for a developmental anomaly of a tissue which still remains identifiable with its physiologic structure and does not assume autonomous and destructive growth; the authors extend the expression hamartosis to denominate a congenital anomaly affecting the whole vascular system. Their patient, a woman aged 42 years, had telangiectases in the palpebral conjunctivas, in the fingernail folds and in the bladder, and a very pronounced retinal vascular tortuosity. They believe that the syndromes of Hippel-Lindau, Osler-Rendu, Sturge-Weber, Coats, and Groenblad-Strandberg all are related phenomena, due to a congenital anomaly of the mesenchymal system, particularly of the encephalo-chorio-retinal vascular tissue. (8 figures, bibliography.)

K. W. Ascher.

Barraquer Moner, José-I. **A speculum (Ecarteur) for operation of detached retina.** Ophthalmologica, 1946, v. 111, Jan., pp. 61-64.

The author recommends three instruments to be used in the operation for detachment of the retina instead of the lid speculum: a forked double muscle hook that can be slipped under two adjacent rectus muscles, a simple hollowed hook which is needed in introducing the former and a spoon-shaped spatula that is introduced into the orbit and serves as a retractor.

The advantage of these instruments lies in the fact that the cornea is protected by the eyelids during the operation. (1 photograph, 3 drawings, bibliography.) F. Nelson.

Cutler, N. L. **Transplantation of human vitreous.** Arch. of Ophth., 1946, v. 35, June, pp. 615-623.

A technique is described for the transplantation of human vitreous from one eye to another. From 1.5 to 2 cc. of vitreous is aspirated from the recipient eye through an equatorial scleral incision using an 18 gauge needle and 2 c.c. of vitreous from the donor eye is then injected through the same needle. Three eyes in which this procedure was utilized are reported in detail. All three had old vitreous hemorrhage. In two of them the operation was successful with a decided reduction in the opacity of the vitreous. In the third there was failure, probably because of an old retinal detachment and a recurrent vitreous hemorrhage. There was a moderate reaction after the procedure, but no evidence of a foreign protein reaction was noted. The tension of all three eyes returned to normal within a reasonable period and remained normal. The blood group does not appear to be significant. (References, 1 figure.)

John C. Long.

Elwyn, H. **Heredodegenerative diseases of the retina.** Arch. of Ophth., 1946, v. 35, June, pp. 662-669.

Heredodegeneration is used to designate diseases of the central nervous system which in the main are characterized by a specific loss of neural tissue as a result of hereditary influences. These diseases may be classified according to the conditions under which they are found or according to the anatomic structure involved.

Diseases originating in Bruch's membrane include disciform degeneration of the macula and angioid streaks in the fundus. Hyaline bodies originate in the pigment epithelium. Among the numerous diseases of the neuroepithelium are macular degeneration of various types, retinitis pigmentosa, retinitis punctata albescens, congenital night blindness, color blindness, gyrate atrophy, and choroideremia. Disorders of the ganglion cells give rise to Tay-Sachs disease, juvenile type of amaurotic familial idiocy, and Niemann-Pick disease. Involvement of the nuclear layers produces peripheral cystoid degeneration and widespread cystoid degeneration, forming the basis for rupture of the retina with hole formation. Retinitis circinata also originates in the nuclear layers. Tuberous sclerosis is a widespread heredodegenerative disease causing the production of abnormal cells and tumors in the nerve fiber layer. (References.) John C. Long.

Feigenbaum, A., and Kornblüth, W. **Intravitreal injection of penicillin in a case of incipient abscess of the vitreous following extracapsular cataract extraction. Perfect cure.** Ophthalmologica, 1945, v. 110, Nov.-Dec., pp. 300-305.

A case of abscess formation in the vitreous following extracapsular cataract extraction and its complete cure by intravitreal injection of penicillin is described. The adjuvant value of subconjunctival injections in overcoming the infectious process is stressed. The probability of synergistic action from the simultaneous use of sulfadiazine is mentioned. (References.) F. Nelson.

Filatov, V., and Verbitska, V. **Treatment of retinitis pigmentosa.** Am. Rev. Soviet Med., 1946, v. 3, June, pp. 388-394.

The injection of cod liver oil in retinitis pigmentosa produces a rapid improvement. In some instances effects are noted after one to two injections.

Increase in light sensitivity can be obtained by intramuscular injections of cod liver oil and by other methods in retinitis pigmentosa. The increase in light sensitivity after cod liver oil treatment is superior to other methods used. For example, when the Lauber method was used, the increase of light sensitivity was not more than 10 times in only one out of five cases. When retinol was used, there was an increase of 10 to 15 times only in five patients out of 12. Twelve cases of retinitis pigmentosa were treated by parenteral administration of cod liver oil, and in one patient there occurred an increase in light sensitivity of 1000 times, in another an increase of 50 times, and in five cases an increase of 10 times.

Effects produced by the use of cod liver oil were observed in very severe, chronic forms of the disease.

On the basis of these observations it can be said that the parenteral use of cod liver oil in the treatment of reti-

nitis pigmentosa is very effective and deserves further study.

The authors' cases of retinitis pigmentosa, treated with injections of cod liver oil, could not be followed for a long enough period. It is still too early to judge results. Further observations might indicate prolonged treatment or repeated injections at intervals.

Filatov thinks that cold liver oil acts not only through its vitamins, but also through other liver by-products. He worked with the transplantation of preserved tissues, such as skin and conjunctiva, and showed the effect of these products. In order to verify the mode of action of cod liver oil, a small piece of human liver preserved at a low temperature was implanted under the skin of a patient with retinitis pigmentosa. Theodore M. Shapira.

Filatov, V. **Retinitis pigmentosa.** Am. Rev. Soviet Med., 1946, v. 3, June, pp. 395-396.

Favorable results have been obtained in retinitis pigmentosa after implantation of preserved vascular membrane or placenta under the conjunctiva on the trephined sclera. Similar effects followed implantation of liver under the skin of the abdomen, transplantation of preserved skin to the head or the abdomen, and injection with cod liver oil.

Treatment by injection of cod liver oil was given to 60 patients; in 8 there was no effect; in 52, improvement was noted subjectively and during functional examination of the patient.

The patients showed heightened visual acuity, often to 0.2 to 0.3, and sometimes to 0.5 to 0.6. There was improvement also for close reading. The field of vision was widened 15 to 20 per cent, both peripherally and in the center, so that sometimes there remained only annular scotoma, which was sometimes incomplete. Moderate improvement in dark adaptation was also observed. Sometimes it was considerable and in individual cases complete restoration was noted.

Another important finding was decrease and even complete disappearance of photopsy which was apparently first established as a symptom of retinitis pigmentosa by Verbitska.

In the majority of the patients improvement of visual functions occurred after the first 4 to 10 injections of 0.5 c.c. each, and in some after 15 to 25 injections. Improvement of functions does not stop after discontinuing injections, and may persist for a few weeks. After several months the functions may regress, but can be restored by repeated courses of cod liver oil or additional tissue transplantations.

Implantation of placenta under the conjunctiva was made in 22 patients; implantation of placenta was also performed subcutaneously in six. In these 28 patients the results obtained were approximately the same as those with cod liver oil, namely a marked improvement in 22. Implantation of preserved liver under the skin gave a significant and prolonged effect in four out of five patients. Transplantation of skin produced an effect in 7 of 17.

It is apparent that the fight against retinitis pigmentosa, which seemed hopeless, is nevertheless possible; and modern ophthalmology need not confine itself to the recording of retinitis pigmentosa nor need it reconcile itself to the inevitable blindness.

Treatment by implantation of preserved tissues and by intramuscular injections of cod liver oil, singly or in

combination, is a most effective method for the treatment of retinitis pigmentosa. It does not lead to cure, but aids the handicapped by restoring work capacity. Theodore M. Shapira.

Filatov, V. P., and Verbitska, V. A. **Implantation of preserved placenta in retinitis pigmentosa.** Am. Rev. Soviet Med., 1946, v. 3, June, pp. 397-398.

The favorable effect obtained in retinitis pigmentosa by parenteral administration of cod liver oil depends, according to Filatov, not only on the contained vitamins, but also on the disintegration products of the liver formed during its preparation. Improved retinal functions observed after implantation of preserved liver in retinitis pigmentosa confirm this supposition. However, Filatov held that the influence of preserved liver on the retina is not specific and that other preserved tissues also can produce such an effect.

Three cases of retinitis pigmentosa are presented here in which implantation of preserved placenta was made.

The case histories cited show that implantation of placenta in retinitis pigmentosa gives encouraging results. A prolonged period of observation is necessary for proper evaluation of this therapeutic measure.

Theodore M. Shapira.

Filatov, V. P., and Verbitska, V. A. **Implantation of preserved liver.** Am. Rev. Soviet Med., 1946, v. 3, June, pp. 398-399.

Several cases of retinitis pigmentosa were treated by intramuscular injections of cod liver oil with good results. Filatov thinks that the active principle of cod liver oil is the byproduct of liver obtained during the extraction of oil. The action of cod liver oil is analogous to the action of transplanted preserved tissue. To verify this supposition liver was implanted subcutaneously in cases of retinitis pigmentosa.

Two cases are presented in which such implantation was performed. In the cases cited implantation of liver caused definite improvement in retinal functions.

The cases presented are indirect confirmation of Filatov's proposal that the active principle of cod liver oil is the byproduct of liver disintegration.

Theodore M. Shapira.

Fritz, M. **The effect of cranial trauma on the retinal circulation in war injuries.** Bull. Soc. Belge d'Ophth., 1945, no. 81, April 29, pp. 45-50.

The change in the retinal circulation following cranial traumatism in war injuries consists of an alteration in arterial tonus. The author points out that there is either a decrease in tonus, which is the usual case, or an increase in tonus, and occasionally it is possible to have a diminished and raised tonus simultaneously, affecting different arterial sectors in the same individual. The author also notes that a frequent change following cranial trauma is perivascular retinal edema, which is actually the factor responsible for the pathologic enlargement of the angioscotoma. He presents a case of a war wound in the parieto-occipital area, in which funduscopy revealed that the central retinal artery was abnormally constricted, although the nasal superior branch was dilated. M. R. Cholst.

Hazelton, A. R. **The nature of starvation amblyopia.** J. Royal Army Med. Corps, 1946, v. 86, April, pp. 171-178.

Of a group of 409 patients at an

Australian Army hospital, who complained of dimness of vision, 277 were classified as having "avitophthalmia," either active or inactive. The active group (156) presented symptoms which were classified in two groups: (a) eyestrain (exhaustion of ciliary muscle), and (b) retinal damage. In the former group, characterized by headache, pain in eyes, and heaviness of lids, marked improvement was obtained by administration of thiamine. The latter group was characterized by blurred daytime vision, photophobia, transient central scotoma, and changes in colors.

The author uses the Ladd-Franklin color theory to explain the reported color changes in terms of a deficiency of the photosensitive substance of the retinal cones. Administration of thiamine, nicotinic acid, and haliver oil had no effect upon these "retinal" symptoms.

Eight patients received, in addition to their regular diet, 10 raw eggs daily for 30 days. All eight were considered to have benefited from this dietary regime; one case was considered "cured." Benjamin Milder.

Ibáñez Puiggari, M., and Malbrán, J. **An apparatus for surgical treatment of retinal detachment.** Arch. Chilenos de Oft., 1945, v. 2, Nov.-Dec., pp. 7-13.

With detailed description and abundant illustration, the authors discuss an apparatus for use in connection with the detachment operation, including diathermy appliances, ophthalmoscope to be used during the operation, and other particulars. The whole apparatus is stored in a large metal chamber, capable of being hermetically sealed, using formalin tablets for sterilization, and attached to the wall by a bracket permitting adjustment in the vicinity of the operating table. Detailed study of the original descriptions and illustrations is essential for understanding of the device. (6 photographs, full-page clinical drawing, references.)

W. H. Crisp.

Joly, J. P. **A case of exudative retinitis (Coats).** Arch. d'Opht., 1946, v. 6, no. 1, pp. 46-48.

A case of unilateral exudative retinitis, considered to be Coats' disease, was observed in a young man of 19 years. The fundus lesion, which was in the upper temporal region, was complicated several weeks after onset by a cyclitis. Focal infection studies were negative. There was no family history of tuberculosis. Nonspecific therapy resulted in some improvement.

Phillips Thygeson.

Longhena, Luisa. **Two cases of Intraocular cysticereus.** Riv. di Oftalm., 1946, v. 1., Feb., pp. 94-109.

One patient with a subretinal cysticercus cellulosa refused to undergo the proposed operation; in the other, the parsite was found in the vitreous and the eye enucleated. The pathologic findings are described. (8 illustrations, bibliography.) K. W. Ascher.

Maeder, G. **Hereditary hemeralopia and syndactyly. Ophthalmologica,** 1946, v. 111, April-May, pp. 278-284.

Congenital severe hemeralopia and syndactylism of the toes were found in four generations of a family. The pedigree is outlined. Only one family member apparently was affected with both anomalies. The possibility of a lesion in the diencephalon and a relationship to the Lawrence-Moon-Biedl-

Bardet syndrome is mentioned. (3 figures, references.)

Alice R. Deutsch.

Maggiore, L. **On the functional relations between the pigmented epithelium and the neuro-epithelial layer of the retina.** Ann. di Ottal. e Clin. Ocul., 1946, v. 73, Jan., pp. 3-16.

On the basis of studies and observations made by himself and others the author formulates three hypotheses to explain the partial persistence of visual function in the affected part of the retina in shallow detachments and in incomplete re-attachments of the retina.

1. The partial persistence of visual function may be due to the fact that the pigment-bearing processes of the pigmented epithelium—in the form of finely drawn-out filaments—may bridge the space between the pigmented epithelium and the neuro-epithelium. Only when the space between these layers exceeds a certain limit, so that it is no longer bridged in this fashion, does the affected part of the retina become absolutely blind. The progressive reduction in vision can thus stand in direct relation to the progressive decrease in these residual connections between the two layers.

2. It may also depend on the amount of fluid separating the two layers. If the amount is small, the concentration of substances originating in the pigmented epithelium may be sufficient to act upon the neuro-epithelium and thus assure a certain measure of visual function, whereas, if the amount of fluid exceeds a certain limit, the dilution, of the substances diffused from the pigmented epithelium may be so great that the neuro-epithelium is not affected by them. The subretinal fluid, either by its mere presence or by its chemical constitution, may also affect the normal metabolism of the retina.

3. According to Schanz's theory, electrons liberated from the pigment cells by the action of light or originating in reactions between substances produced by the pigment cells and other substances contained in the rods and cones, play an essential part in vision. The partial persistence of visual function may be explained by the supposition that these electrons can act upon the rods and cones only when the thickness of the subretinal fluid does not exceed a certain limit.

None of these three hypotheses can be considered sufficient in itself to furnish an adequate explanation, but they are all in accord with the clinical observation that the visual function of the retina is retained to a certain extent in shallow detachments but is completely annulled in bullous detachments.

Harry K. Messenger.

Miranda, A. G. **Acute hypotony in retinal detachment.** Arch. de la Soc. Offt. Hisp.-Amer., 1945, v. 5, Aug., pp. 664-672.

The literature is reviewed, and a case of this rare occurrence reported. The 56-year-old woman, with myopia of 20 diopters and a history of a loss of vision in the nasal part of the field of the left eye of two weeks duration, presented herself with violent pain and intense congestion in the eye. She had conjunctival chemosis, corneal cloudiness, turbid aqeous, a deep anterior chamber, an almost complete retinal detachment, and a detachment of the inferior nasal portion of the choroid. The tension was negative, and the eyeball was extremely sensitive to touch. Under atropine the acute symptoms subsided in six days, and the

choroidal detachment disappeared. The pathogenesis of the phenomenon is discussed, and it is pointed out that the presence of the ciliary injection, the turbid aqueous, and the pain indicate the presence of a cyclitic process. Possibly the products of disintegration of some of the constituents of the subretinal fluid were the cause. The detachment of the vitreous so frequent in retinal detachment, through retraction of the iris and lens may have produced the deep anterior chamber. Functional circulatory disturbances, and scleral dehiscences with escape of the intraocular fluid are also factors to be considered in the genesis of acute hypotension in some cases. Since the use of a compressive bandage in the treatment of retinal detachment has been abandoned, cases of acute hypotension are encountered rarely. (Visual field.)

Ray K. Daily.

Monnier, M., and Amsler, M. **Objective examination of the function of the retina with the electroretinogram in a case of concentric contraction of the visual field.** Ophthalmologica, 1945, v. 110, Nov.-Dec., pp. 225-241.

After an accident without direct injury to the skull a patient had various subjective and objective encephalopathic symptoms. Among them were mouches volantes, fatigability during reading, insufficiency of convergence, "accommodtonie", diminution of the central visual acuity, and concentric narrowing of the visual field, with occasional variations from day to day but never larger than 60° on the temporal side and 35° on the nasal.

Electroretinograms showed that the retina had a normal, if not increased receptivity, even in the peripheral, apparently blind parts of the fields. Furthermore, the considerable amplitude of the positive potentials, particularly of the b_4 potential, seemed to indicate that the retinal excitations were normally discharged in the optic nerve.

On the basis of these electroretinographic data, one would have expected the patient to be dazzled and to present exaggerated blinking reflexes but he behaved as though the retinal excitations, normally discharged in the optic nerve, did not reach the visual centers and the motor centers of the blinking reflexes. Since the first optic neurones functioned normally, as proved by the electroretinogram, it must be assumed that the optic excitations were stopped either at the level of the mesodiencephalic synapses (superior, colliculus lateral geniculate bodies), or at the level of the optic neurones in the occipital center. The evidence and localization of such synaptic stoppage are discussed in the light of experimental and clinical data. The physiopathology of the concentric narrowing of the visual field and the partial loss of the blinking reflex are also discussed. (References, photograph, 1 table, diagrams, visual fields.)

F. Nelson.

O'Malley, C. L. **Retinal hemorrhage with vitreous clouding in young adults (Eales' disease).** Trans. Ophth. Soc. U. Kingdom, 1944 v. 64 pp. 261-269.

The author describes four patients with recent vitreous hemorrhages. The oldest patient was a woman 36 years of age and the other three were young men 22, 29, and 30 years of age.

He divides the disease into four distinct stages. In the first stage small round hemorrhages are seen scattered in the periphery and related to the small end twigs of the venous branches

and there is low intraocular tension. In the second stage there is leakage of blood and plasma from the larger venous branches into the pre-retinal plane with associated vitreous clouding. Vision is not affected. In the third stage main trunks are involved. Blood and exudate leaks along vessels and into the vitreous which becomes densely clouded. Vision is reduced and ocular tension increased. In the fourth stage the fundus shows the scars of many attacks with permanent vitreous clouding and vascularized fibrous tissue bands. Ocular tension is increased. Eales' disease has many characteristics of an allergic response. The specific lesion is a peripheral endophlebitis associated with a sex-linked hormone.

Beulah Cushman.

Redslob, E., and Bronner, A. **Retinal hemorrhages in senile purpura and glaucoma without hypertension.** Ann. d'Ocul., 1946, v. 179, no. 2, pp. 64-70.

This unusual combination of degenerations was observed in a woman 74 years of age. Intraocular hemorrhages with absorption followed cataract extraction in both eyes. Concurrent hemorrhages appeared in the skin, especially near the elbow. Upon excision the skin showed absorption of the elastic tissue which resulted in enlargement of the capillaries and subsequent hemorrhage. Blood tests and other examinations were essentially negative.

The author reasons that intraocular hemorrhage and glaucomatous excavation with hypotension were due essentially to constitutional presenile degeneration which involved the absorption of the elastic tissues in and about the vessels and in the papilla. Secondary capillary dilatation with occasional transient hypertension presumably caused the hemorrhages.

Charles A. Bahn.

Regoli, Attilio. **Angioid streaks of Knapp with cardiovascular changes.** Boll. d'Ocul., 1944, v. 23, Oct.-Dec., pp. 209-228.

A man, 35 years of age, and recently affected by marked diminution of vision in both eyes, showed the classic picture of angioid streaks of the retina with a diffuse chorioretinitis of the macular and perimacular regions in both eyes. The general examination revealed changes in the cardiovascular system as evidenced by a mitral murmur and slight hypertension. The cardiovascular changes have great importance from a diagnostic point for these general changes are associated with changes of the elastic tissue. The retinal streaks are not to be considered a distinctive entity but as part of a complex syndrome that results from a dystrophy of the elastic tissue of degenerative origin. In this patient there was no elastic pseudoxanthoma of the skin, therefor this disease represents an incomplete syndrome of systematized elastorexis. (Bibliography.)

Melchiore Lombardo.

Rønne, Gerhard. **Local treatment of intrabulbar infections. General Considerations.** Acta Ophth., 1944, v. 22, pt. 1, pp. 95-104.

Rønne discusses the general criteria for experimental investigation on the efficacy of intrabulbar injections. The isolation of the ocular contents by a thick capsule, the transparency of the media that permit observation of the intraocular process, and the non-cellular structure of the vitreous make the eye a sensitive and easily accessible

biological medium. The literature on experimental intrabulbar therapy is briefly reviewed, and the reasons for the lack of development of clinical intrabulbar therapy is discussed.

Ray K. Daily.

Santoni, A. **Investigations concerning the index of refraction and the pH of the subretinal fluids in idiopathic retinal detachment.** Riv. di Oftalm., 1946, v. 1, Jan., pp. 3-14.

Subretinal fluids obtained during 33 detachment operations from 30 eyes were examined with the refractometer of Pulfrich and with the quinhydron-electrode, if sufficiently large amounts were withdrawn. Fluids containing traces of blood were discarded. The index of refraction of fluids from eyes with a history of eight days to 25 months of retinal detachment, varied between 1,334 and 1,340; no definite relationship was found between duration of the detachment and refractive index. There was no correlation between the refractive index and the operative result. Santoni stresses the possibility of errors due to previous small hemorrhages into the subretinal fluid. The H-ion concentration varied from pH 7.45 to pH 8.00. Whereas the fluids having a pH of 7.67 to 8.00 were withdrawn from detachments of long duration, more recent detachments revealed readings as high as 7.73 and 7.8. He compares his results with those obtained by Weve and Fischer, and those of Contino, and discusses the retinal metabolism in normal and in diseased eyes. The shift to the alkaline side may be due to the production of ammonium and of other amines as suggested previously by Weve and Fischer.

K. W. Ascher.

Satanowsky, Paulina. **Two cases of embolism of a branch of the central retinal artery with recovery.** Arch. de Oft. de Buenos Aires, 1943, v. 18, Nov., p. 579.

Two cases of sudden and complete obstruction of a branch of the central retinal artery in elderly individuals with hypertension are reported. After treatment with acetylcholine and nicotinic acid the symptoms gradually disappeared and the ophthalmoscopic picture improved. The differential diagnosis of spasm and embolism is discussed with special emphasis on the perimetric findings. (Visual field charts, bibliography.) Plinio Montalván

Schantz, E. M., Embree, N. D., Hodge, H. C., and Wills, J. H. Jr. **The replacement of vitamin A_1 by vitamin A_2 in the retina of the rat.** J. Biol. Chem., 1946, v. 163, May, pp. 455-464.

The experiment reported in this paper was performed to determine the extent to which animals using vitamin A_1 (ordinarily referred to as "vitamin A") in their bodily functions could replace the A_1 with vitamin A_2. The livers of fresh-water fish have been found to contain vitamin A_2, a substance closely related to vitamin A_1, which is found in man and most other animals. These same fresh-water fish have a photosensitive retinal pigment different from the rhodopsin, or "visual purple," of human retinas. This pigment, called "porphyropsin," has an absorption spectrum which is distinct from that of rhodopsin.

In this experiment, albino rats were depleted of their normal vitamin A_1 stores, and then were fed diets containing only vitamin A_2 for twelve weeks. It was found that the visual

purple, or rhodopsin, normally found in the rats, had been replaced by porphyropsin (measured spectrophotometrically). Further, bleaching of the retinas of these rats produced no retinene, a substance normally found after the bleaching of rhodopsin.

Vitamin A_2 was stored in the livers of these experimental rats, just as vitamin A_1 is normally stored. In the blood, however, the vitamin A_2 level was built up very slowly, while the vitamin A_1 levels diminished little.

The authors concluded that vitamin A_2 could replace A_1 satisfactorily in many bodily functions.

Benjamin Milder.

Schmid, A. E. **Relations of periphlebitis of the retina and recurrent juvenile hemorrhages into the vitreous to endangiitis obliterans.** Ophthalmologica, 1945, v. 110, Nov.-Dec., pp. 259-291.

The author outlines the history of the subject and reviews the literature. He analyzes the examinations of the eyes of 86 patients with endangiitis obliterans of 25 patients with periphlebitis of the retina and juvenile recurrent hemorrhage of the vitreous.

Marchesani's contention that periphlebitis of the retina and juvenile hemorrhage of the vitreous are manifestations of endangiitis obliterans cannot be proved. Periphlebitis of the retina, juvenile recurrent hemorrhages of the vitreous, and the accompanying iridocyclitis are, if not exclusively, in the majority of cases due to tuberculosis. (2 tables, 3 curves, 2 Rontgenograms.)

F. Nelson.

Stenstrom, Solve. **Retinitis centralis serosa.** Acta Ophth., 1943, v. 21, pt. 1-2, pp. 97-106.

This disturbance which frequently occurs in Japan, is characterized by a circumscribed macular edema. It is thought to be rare in Europe, but the fact that five cases were seen at the Sahlgren eye clinic in one-half year suggests that perhaps these cases are not as rare as is believed, and that many are being overlooked. Stenstrom's five cases had no definite etiology, and he suggests that this may be a symptom complex of varied etiology and not a disease entity. That it may occur on a vascular basis is shown by one of his cases in which the macular lesion appeared in a hypertensive fundus. After a time the picture changed to that of a hypertensive retinitis.

Ray K. Daily.

Traquair, H. M. **The nerve fibre bundle defect.** Trans. Ophth. Soc. United Kingdom, 1944, v. 64, p. 3.

The author describes in detail the anatomy and vascular supply of the retina in order to clarify some of the questions which arise in the analysis of visual fields.

The fibres from the nasal half of the retina converge directly from the periphery to the papilla in a straight course. The temporal fibres lie in arches above and below the macular area. The arches extend from the raphé, which lies on the horizontal meridian between macula and periphery, to the papilla. On the papilla the fibres are gathered together to form a thick cushion, except in the temporal quadrant where the nerve fibre layer appears thinner and less vascular.

The term *nerve fibre bundle* refers to any small group of fibres which lie together as they enter the papilla although there is no anatomical segregation into such groups in the retina. Lesions of such a group near the

papilla cause a scotoma that corresponds to the area of fibres involved, and is wedge-shaped or cuneate, narrow near the blind spot and wider peripherally. Arcuate bundles consist of uncrossed and crossed fibres, and straight bundles are made up of crossed fibres only. The nerve fibre raphé ceases at the temporal edge of the fovea.

Retinal arteries have an arrangement similar to that of nerve fibres. The vascular twigs overlap the temporal half of the horizontal meridian above and below and follow a wavy line. Vessels often pass through the macula towards the papilla and may divide the macula horizontally. On the nasal side the arteries extend in a radial direction. The papillo-macular area may be wholly or partly supplied by a cilioretinal artery. The optic nerve is nourished by small branches of the ophthalmic artery. The chiasma receives twigs from the adjacent vessels.

The nerve fibre bundle defect is recognized by its shape and is the result of any localized lesion which impairs the conducting power of a group of adjacent fibres. The most common are the lesions produced by glaucoma and the inflammatory focus of deep choroiditis. Other causes are vascular obstruction, foreign bodies in the retina, and retinal hemorrhages. The causal lesion may be situated in the visual pathway behind the eyeball as far back as the chiasm. When the field defect does not extend to the periphery it may be assumed that the whole thickness of the nerve fibre bundle is not affected.

Vascular obstruction may affect the functional efficiency in the retinal area of the distribution of the affected vessel because both ganglion cells and nerve fibres are deprived of blood, and also because the nerve fibres at some distant point may be subjected to ischaemia and rendered non-conducting. The blind spot is usually separated from the scotoma by an area or bridge because of the double vascular supply of the retina adjoining the papilla.

Nerve fibre bundle defects with scotoma occur in every case of chronic simple glaucoma. The belief that enlargement of the blind spot is an early sign of glaucoma is based on inadequate observation. The scotomas may begin anywhere in the line of the arcuate fibres except at the edge of the blind spot; 60 percent arise in the upper part of the field and less than 40 percent in the lower. Straight cuneate defects on the temporal side of the blind spot are rare in the early stages. The temporal side of the blind spot appears to be lost by peripheral depression in quite a different manner from that on the nasal side.

The author does not feel that the piling up of the nerve fibres on the nasal side of the disc explains the characteristic scotoma as the upper part of the field may be completely destroyed while the lower is intact or vice versa. On the nasal side the nerve fibre layer is thick and has few blood vessels; on the temporal side the fibre layer is thin and the blood vessels very minute and it is here that the lesions are more frequently found. The invulnerability of the macular fibres is unexplained. Why the defect practically never begins at the equator of the disc on either side and why the field is lost on the temporal side in a manner quite different from that on the nasal side is not clear.

The slenderness of the nerve fibre bundle defect indicates a correspondingly narrow lesion. The growth of the

scotoma towards the blind spot would seem to indicate that it is the position of the affected nerve fibres in the retina that explains the phenomenon.

The fibre bundle defects of glaucoma remain an ophthalmologic puzzle; a study of the finer anatomy of the vascular supply to the fibres may be helpful.

The characteristic central scotoma of retrobulbar neuritis has been attributed to a special vulnerability of the macular fibres but the author feels that the fibres affected are probably selected on an anatomic basis.

Injury to the optic nerve due to a blow on the temple produces the bundle defect more often than retrobulbar neuritis and the damage is probably due to trauma to the small arterial twigs.

In bitemporal hemianopsia the bundle defect can be traced and the most plausible explanation of its characteristics is found in the arrangement of the nutritive vessels.

Definite nerve fibre bundle defects have not been found in lesions above the level of the chiasm.

Nerve fibre bundle defects are never found in toxic amblyopia or the amblyopia of squint. They are common in affections of the visual pathway between the retina and chiasm.

Beulah Cushman.

Vázquez Barriere, A., and Boado, L. A. **Congenital folds of the retina.** Arch. de Oft. de Buenos Aires, 1943, v. 18, Nov., p. 572.

Two cases of congenital folds of the retina are reported. In the first the fold, which coexisted with a persistent hyaloid artery, was related to the position of the fetal cleft; in the second there were no vestiges of the hyaloid artery and the position corresponded to an inferior temporal sector between the three and five o'clock meridians. The literature is briefly reviewed. (Illustrations.) Plinio Montalván.

Weekers, Roger. **Seasonal variations of the frequency of occurrence of idiopathic retinal detachment.** Ophthalmologica, 1945, v. 110, Sept.-Oct., pp. 218-223.

Of 208 cases of idiopathic detachment of the retina 31 percent occurred in summer, 30 percent in spring, 20 percent in autumn and 18 percent in winter. Detachments caused by retinal or choroidal neoplasms or an inflammatory uveal process were eliminated from the statistical material.

Continued intensive solar radiation may be a factor in the development of detachment of the retina. There is reason therefore, to advise patients who are predisposed to this affection to avoid bright light and to wear dark glasses on sunny days.

F. Nelson.

Weekers, Roger. **The cholinesterase of the retina.** Acta Ophth., 1945, v. 23, pt. 2, pp. 161-170.

In this laboratory study extract of bovine retinas was used for the investigation of its cholinesterase content. The data show that it is present in the retina and optic nerve, and is one hundred times more concentrated in the retina than in the nerve. It is evenly distributed throughout the whole retina, equal weights of peripheral and central parts of the retina contain equal amounts of cholinesterase. Its action is inhibited by the injection of eserin into the vitreous. Retinal cholinesterase is stable and maintains its activity after

24 hours in the refrigerator. (Graphs.) Ray K. Daily.

Wille, Herluf. **Investigations on the influence of K avitaminosis on the occurrence of retinal hemmorrhages in the newborn.** Acta Ophth., 1944, v. 22, pt. 3, pp. 261-269.

In a control material of 594 cases, retinal hemorrhages which left no trace after their absorption were found in 42.4 percent. The administration of vitamin K intramuscularly to 316 patients before the onset of labor reduced the incidence of hemorrhages in the infants to 31 percent. Administration of vitamin K after the onset of labor was ineffective. The literature is reviewed and the relation of retinal to cerebral hemorrhage in the new born is pointed out. (Illustration.) Ray K. Daily.

Zentmayer, W. **Angioid streaks of the fundus oculi observed over a period of thirty-six years.** Arch. of Ophth., 1946, v. 35, May, pp. 541-545.

A brief abstract of the clinical history of a typical case of angioid streaks of the fundus oculi observed over a period of thirty-six years is reported. The case was presented before the American Ophthalmological Society in 1909.

A review of the literature on the pathology is given and the author concludes from present evidence that angioid streaks are probably due to degeneration of Bruch's membrane, in which ruptures occur. The hemorrhages that are seen at various stages of the disease result from similar lesions in the walls of the blood vessels and the destructive changes that occur in the macula later are part of the syndrome. The gray zone about the papilla may be a manifestion of the changes in Bruch's membrane; it is the only layer of the retina or the choroid which reaches the optic nerve, and it is much thicker in this area than elsewhere. R. W. Danielson.

11

OPTIC NERVE AND TOXIC AMBLYOPIAS

Andersen, Borge. **Some remarks on the inheritance of Leber's Disease.** Acta Ophth., 1944, v. 22, pt. 3, pp. 233-236.

The author evaluates the statistical data that support Lundsgaard's conclusions in her argument with Rønne. Ray K. Daily.

Broendstrup, Poul. **Primary tumors in the optic nerve.** Acta Ophth., 1944, v. 22, pt. 1, pp. 72-94.

The literature is reviewed, and five cases are reported. Two of the tumors were oligodendrocytomas, and three were meningiomas. Characteristic of oligodendrocytomas is the occurrence of several types of glia cells in the same tumor. The structure of meningiomas is homogeneous. The prognosis, aside from loss of the eye, is good. The tumors do not metastasize, and have no tendency to recur. Therapy consists of removal of the tumor. (4 illustrations.) Ray K. Daily.

Bruetsch, W. L. **Malaria therapy in syphilitic primary optic atrophy.** Jour. Am. Med. Ass., 1946, v. 130, Jan. 5, pp. 14-18.

Malaria therapy is conceded to be the most efficacious method of treatment of primary syphilitic optic atrophy. Routine treatment with arsphenamine, bismuth, and mercury is of no value. The best explanation is that malaria causes an arrest of the inflammatory phase of the neurosyphilitic process that goes

on within the optic nerves. Exactly how this occurs is unknown.

In favorable cases, one course only is needed. Tertian malaria is used. In patients who need another course, it is necessary to use the quartan type. Perhaps the addition of penicillin will prove of more value than therapy with malaria alone.

In patients who react favorably, there will be an expansion of the visual fields; in the others optic atrophy continues.

The relative uselessness of surgery is explained. (3 photographs, references.)

Bennett W. Muir.

Charlin, Carlos (C). **Alcoholic optic neuritis.** Arch. Chilenos de Oft., 1945, 1st yr., May-June, July-Aug., nos. 6 and 7. p. 3.

A general discussion of the subject, as a clinical "lesson" under the two headings of "confessed alcoholism" and "concealed alcoholism," and on the basis of two clinical records of chronic alcoholism, with neuritis and atrophy.

W. H. Crisp.

Esbjerg, H. O. **Central complications (papilledema) in epidemic parotitis.** Acta Ophth., 1943, v. 21, pts. 1-2, pp. 119-125.

This is a report of two unusual cases of papilledema due to a basal arachnoiditis with obstruction of the basal foramina that was a complication of mumps. The symptoms were so severe that the patients were operated upon with the erroneous diagnosis of a tumor in the roof of the fourth ventricle.

Ray K. Daily.

Faranier, G. **Severe optic neuritis from methyl alcohol intoxication.** Ann. d'Ocul., v. 178, 1945, Dec., pp. 528-530.

A man, 44 years of age, developed permanent blindness, weakness, abdominal pain, and delusions after 15 drinks daily of 40 percent methyl alcohol for 16 days. During the first week the pupils were dilated and fixed, the fundus normal. Then a slight papilledema and permanent pallor of the disc became manifest. Charles A. Bahn.

Hultquist, G. T. **About aberrant fibers of the fasciculus opticus.** Ophthalmologica, 1945, v. 110, July-Aug., pp. 1-14.

The author contributes two cases of aberrant fibers of the optic fascicle. In one of them a nerve-fiber bundle left the main fascicle by way of two roots, one of them behind the entrance of the central artery of the retina and the other in the temporal inferior part of the fascia of the eye muscles. After a separate course the aberrant bundle again entered the optic fascicle in the chiasm. Fibers of pure glial tissue radiated from the aberrant bundle as well as from the main stem of the optic fascicle of both sides and ended blindly in the connective tissue of the dura. These fibers are fundamentally interesting, inasmuch as they show that optic fibers that end blindly do exist and that these fibers are not medullated. A second case is described in which a cone of medullated nerve fibers protruded from the ventral side of the chiasm, similar to one reported by Volland. The literature and classification of aberrant optic nerve fibers is discussed, A new classification, based chiefly on the presence or absence of myelin sheaths in the aberrant fibers, is suggested. Max Hirschfelder.

Lundsgaard, Ruth. **The inheritance of Leber's disease.** Acta Ophth., 1944, v. 22, pt. 3, pp. 227-232.

Lundsgaard criticizes Rønne's statistical procedure and believes that his conclusion as to inheritance of Leber's disease is erroneous. Rønne believes to have proved that the inheritance is cytoplasmic, while Lundsgaard believes that the germ for the disease is autosomal, almost completely dominant in the male, incompletely dominant in the female, and with a lethal action on the spermatozoa. Ray K. Daily.

Magitot, A. **The optic nerve and the message it carriers.** Ann. d'Ocul., 1946, v. 179, no. 1, pp. 24-34.

The optic nerve is not a nerve but essentially a commissure which unites two cerebral areas. It contains visual and photomotor centripetal fibers, and also centrifugal fibers whose functions are not yet known. Its 500,000 to 800,000 fibers carry more impulses than the posterior sensory portion of the medulla because the optic nerve acts as a visual receptor for an estimated 130,000,000 rods and 7,000,000 cones. The smaller and more numerous visual fibers are about 2μ in diameter. Since the cells of Schwann are missing, repair and replacement of the optic nerve are impossible. The nerve partly functions before birth, pupillary reactions having been observed in six months premature infants.

The optic nerve is not sensitive to pain, nor to physical or electric excitation. Phosphenes and pain resulting from optic nerve section, are due to traction on the retina and to pressure on the ciliary nerves. These phosphenes do not occur in sections of the intracranial portions of the nerve. The nerve carries principally centripetal impulses which travel at the rate of 300 feet per second, and which are generated by the ganglion cells in the retina. Basic qualities common to all nervous tissues such as the summation and the all or nothing reactions, are also present in the optic nerve. The retina is ten times more sensitive than any photographic emulsion known. Two types of chronaxie are known to exist; (a) those of the photo-motor fibers are four times more rapid than the visual fibers, (b) those of the macular region are more rapid than those of the periphery. Both have been measured by phosphenes produced by electric excitations of known intensities. If the visual cells are solely involved all chronaxies are normal. If the bipolar cells are solely involved, direct excitation will produce abnormal chronaxies. If the ganglionic neurons are involved, only papillary excitation will produce abnormal chronaxies.

All nerve cells are sources of electricity producing two intensities of current; one in the dark and the other in the light. As these waves are similar in form, amplitude, and speed, strong excitations produce a larger number of waves. The latent period of optic nerve waves is 0.1 second. The onset of each wave is brusk and the succession of waves which follow are variable in duration. Different fibers carry different types of messages. Cones are essentially adapted for day vision and color vision; rods for night vision. Recently photochemical substances have been isolated from the cones, each with a different curve of absorption. One substance is sensitive to red, another to yellow, and a third to blue. These substances are not as strong as the visual purple of the rods, but are more rapidly reproduced and are reversible. Thus there are three types of cone fibers; one carrying red impressions, another yellow-green, a third blue.

These are combined in the brain to give the sensation of the color. The visual cortex acts as a huge central telephone exchange which receives and translates these messages. The exact relation of the pupillomotor fibers to the visual fibers is not known. Destruction of the geniculate body and the geniculate route does not modify pupillary mobility, which suggests a possible bifurcation of some fibers before they enter these parts. Anatomically and physiologically this does not seem probable because blindness may occur from optic atrophy with conservation of the photomotor reflex. Pupillomotor fibers apparently do not cross at the chiasm as do the visual fibers because antero-posterior section of the chiasm does not modify the pupillary reactions, direct or consensual. Stimulation of the chiasm and the optic tract however do produce a pupillary contraction. The pupillary fibers apparently occupy the internal border of the optic tract. Pupillomotor fibers carry messages involving pupillary contraction and dilatation, which is important in understanding the Argyll Robertson sign and the Adie syndrome.

The integrity of all nerve fibers depends upon the body of the neuron. The optic nerve has an axone in the ganglion cells.

Intoxications primarily attack different neurons and different fibers. Tobacco poisoning, for example, is accompanied by scotomas which become paracentral on the temporal side and may extend to the blind spot. Since all chronaxies are normal, the process is essentially a destruction of the red-green photochemical substances which eventually affects their cones. These toxic substances are transmitted to the retina from the choriocapillaris. Secondary temporal disc pallor is therefore due primarily to death of specific cones. In intoxication with barbiturates, alcohol, and lead, the ganglion cells are primarily affected. A secondary optic atrophy follows. Profound ischemia of cells involved in vision, if it lasts fifteen to forty-five minutes, usually results in rapid and often permanent loss of sight because the cells involved never return to normal.

Both centripetal and centrifugal degenerations occur in the optic nerve. After severe injuries slightly anterior to the chiasm several weeks elapse before the papilla becomes pale. The optic nerve is most vulnerable in the optic foramen. Charles A. Bahn.

Mollenbach, C. J. **Delayed recovery in retrobulbar neuritis.** Acta Ophth., 1943, v. 21, pts. 1-2, pp. 126-132.

Three cases are reported. A woman 53 years of age had a small central scotoma and 6/60 visual acuity, with temporal pallor of the optic disks. Improvement set in 1½ years after the onset of the symptoms, and after 2½ years recovery was complete with vision 6/6 and 6/9 in the right and left eye, respectively. A man 54 years of age began to improve slowly 11 months after the onset of the illness. At the end of two years his vision improved from 6/60 to 6/12, and the relative central scotomata were much smaller in size. The third patient, a man, 31 years of age, had Leber's optic atrophy and after an improvement in visual acuity which began one year from the onset of the disease and lasted six months, visual acuity was again badly impaired, and the scotomata increased in size. (3 visual fields).

Ray K. Daily.

Offret, G. **Concentric bodies in the sheath of the optic nerve, their significance and clinical interest.** Arch. d'Ophth., 1946, v. 6, no. 1, pp. 29-42.

Offret notes that concentric bodies (corpora arenacea) are seen in eyes from patients with various eye diseases, often without optic nerve involvement. The bodies are always found in connection with the arachnoid, generally in the subdural space. Since they are not seen apart from arachnoid cells, the author concludes that they must be formed by this membrane. He examined a large number of optic nerves from embryos, fetuses, infants, adults, and aged persons in longitudinal and transverse sections and found the bodies only in adult and aged eyes. He describes in some detail the morphology and constitution of the bodies and stresses the role of cell nests in their formation. The various stages in the formation of the bodies are described and the tinctorial properties noted. The author found the distribution of the bodies to be of interest. The majority were in contact with the dura, which they penetrated more or less deeply, and there was a concentration in the zone of the central vessels. He notes the similarity of the bodies to those encountered in the normal cerebral meninges and in meningoblastomas. The article is illustrated with twelve drawings. Phillips Thygeson.

Perera, C. A., and Stout, A. P. **Intraorbital melanosis and intracranial neuroepithelioma of the optic nerve.** Arch. of Ophth., 1946, v. 35, June, pp. 678-687.

A two-year-old Armenian girl was observed with glaucoma of the right eye. An iris inclusion operation was done which was followed by recurrent hemorrhages and finally, enucleation. During the enucleation a ring of pigmented tissue was noted around the optic nerve extending about one inch into the orbit. This tissue was dissected out. Pathologic studies of the eye showed, in addition to the glaucomatous changes, complete detachment of the retina and a dense connective-tissue membrane behind the lens. In the optic nerve behind the globe was seen an unusual pigmented lesion, associated with rounded, hyaline masses and small psammoma bodies. A diagnosis of melanosis of the optic nerve was made. Later the child developed signs of a brain tumor and died. A neuroepithelioma of the right optic nerve, the optic chiasm, and the base of the brain was found. Complete pathologic studies of the involved tissues are reported. The literature dealing with melanotic lesions of the leptomeninges is discussed. (Eight photographs.)

John C. Long.

Rintelen, F. **Arteriosclerotic optic atrophy.** Ophthalmologica, 1946, v. 111, April-May, pp. 285-290.

The author's investigation consisted of the examination of 35 optic nerves from persons between 44 and 48 years of age. They were compared with eight nerves of younger persons with healthy vessels. The pathologic examination showed patches of degenerated nerve fibers with overgrowth or glial tissues and cyst formation caused by partial vascular occlusion, mostly close to the optic disc. The disease is not rare and may be the most frequent type of optic atrophy.

The diagnosis rests chiefly on the exclusion of other causes for the atrophy.

The author distinguishes three forms of arteriosclerotic optic atrophy. The

benign form characteristically affects old persons and manifests itself in the periphery of the nerve as senile capillary necrosis. A malignant form occurs in young people as well and progresses rapidly. Softened plaques appear in the optic nerve especially in the vascular part. Clinically this form may suggest glaucoma without hypertension. A third form results from direct pressure of the sclerotic carotid artery on the optic nerve and is clinically rare.

Alice R. Deutsch.

Rønne, Henning. **The inheritance of Leber's disease.** Acta. Ophth., 1944, v. 22, pt. 2, pp. 203-213.

The author disagrees with Ruth Lundsgaard's conclusions (Leber's disease, Copenhagen 1944, Gyldendalske Boghandel) as to the type of inheritance of this disease. By an analysis of 12 of Lundsgaard's pedigrees and of 7 referred to by her in the literature Rønne believes to have demonstrated that the inheritance of Leber's disease is cytoplastic and not autosomal.

Ray K. Daily.

Rucker, C. W. **Bitemporal defects in the visual fields resulting from developmental anomalies of the optic disks.** Arch. of Ophth., 1946, v. 35, May, pp. 546-554.

One of the most dependable axioms in ophthalmology is that bitemporal hemianopsia indicates a lesion at the optic chiasm. Six cases reported here demonstrate that even to this rule there may be exceptions which can occasionally cause difficulty in diagnosis.

The types of field defects illustrated in these cases have been recognized for many years and are briefly described in two of the current standard textbooks on perimetry.

When it is suspected that a bitemporal hemianopic depression is due to anomalous disks rather than to a chiasmal lesion, the way in which the defect behaves at the midline may be diagnostically helpful. If it passes smoothly from the temporal into the nasal field without deflection, it is probably the result of a distortion of structures at the nerve heads. A distinct step at the midline occurs in association with chiasmal lesions.

R. W. Danielson.

Van Bogaert, L., and Van Leeuwen, A. **First anatomic and clinical observations on the hereditary familial optic atrophy of Behr.** Bull. Acad. roy. de med. de Belgique, 1942, v. 7, April, pp. 218-225.

The authors describe their observation of a patient with hereditary optic atrophy. From a pathologic study of the tissues they conclude that in the optic system the second neuron is degenerated in its entirety; the third is almost intact, the visual cortex normal. They do not mention the condition of the first neuron (bipolar cells) or the rods and cones. They found an associated cerebello-spinal degeneration of the Friedreich type. This disease is an essentially degenerative one and the types of Leber and Behr, are variations of the same heredo-familial degenerative process. Jose Saenz Canales.

12

VISUAL TRACTS AND CENTERS

Brenta, J. and Danis, P. **Bitemporal hemianopsia of traumatic origin.** Ophthalmologica, 1946, v. 111, Jan., pp. 8-27.

The authors report in detail their observations of a patient with a post-traumatic chiasmal syndrome and thoroughly analyze their findings in the

light of data in the literature. In some cases direct mechanical trauma is the cause of the disturbances of vision and a sagittal tear of the chiasm that sometimes includes neighbouring tissues. In others a secondary process following the injury must be added to the mechanical effect and in a third category the secondary process alone produces the symptoms. It is obvious that the syndrome indicates an injury to the chiasm, but, since its appearance is apparently not dependent upon injury to the chiasm by a fragment of bone, its value in localising the fracture in the middle cerebral fossa is restricted. Its prognostic importance is dependent on the mode of origin. The investigation of visual disturbances must be continued over a long period; their increase may necessitate an operation in the area of the chiasma. (13 figures, references.) F. Nelson.

Greear, J., and McGavic, J. **Visual disturbances associated with head injuries.** Arch. of Ophth., 1946, v. 35, July, pp. 33-54.

The authors review the literature and report twelve cases of head injury in battle casualties. It was found that correlation of visual-field defects with definitely known sites and types of head injury, the notation of lesions found at operation and the results of roentgenographic examination of the skull offers the best method of studying the cortical representation of various areas of the retina. Cortical representation of the fixation area (macula) is similar to cortical representation of the peripheral portions of the retina. The fixation area is represented at the posterior tip of the occipital lobes, while the peripheral portions of the retina are represented in the cortex at the anterior end of the calcarine fissure. Similarly, the upper half of the retina is represented in the cortex above the level of the calcarine fissure, while the lower half of the retina is represented below the calcarine fissure. Neither the fixation area (macula) nor the peripheral area of the retina has duplicate areas of representation. (References, 12 illustrations.) R. W. Danielson.

Knapp, P., and Schwarzmann, A. **Contraction in the visual fields caused by a diencephalic lesion.** Ophthalmologica, 1946, v. 111, April-May, pp. 270-278.

Concentric contraction of both fields of which the patient is unaware is a new symptom in diseases of the diencephalon. An illustrative clinical history is reported. The patient had the visual disturbance and endocrine and vasomotor changes such as hyperthyroidism, secondary amenorrhea, migraine, fainting spells, and acrocyanosis.

The anatomy and physiology of the diencephalon and the treatment are reviewed. (2 fields, references.)

Alice R. Deutsch.

Knüsel, O. **Demonstration of visual fields in an opticochiasmal arachnoiditis.** Ophthalmologica, 1946, April-May, v. 111, p. 298.

The author reports the clinical record of a patient with opticochiasmal arachnoiditis. The patient had headache, impairment of vision, and loss of weight after cranial injury. There was concentric contraction and a ring scotoma in the right eye, and concentric contraction and a central scotoma in the left. Alice R. Deutsch.

Miranda, A. G. **Binasal hemianopsia.**

Arch. de la Soc. Oft. Hisp.-Amer., 1945, v. 5, June, pp. 472-492.

A case of an infiltrating subcortical glioma of the frontal lobe in a man 33 years of age is reported. The initial symptoms were headache, dizziness, and vomiting, followed rapidly by visual disturbances, bilateral choked discs, and a binasal hemianopsia. The diagnosis was confirmed surgically. The literature on binasal hemianopsia is reviewed, and reference made to Zeeman's publication in Ophthalmologica in 1943. The author concludes that binasal hemianopsia is a pathologic entity indicative of a lesion of the optic nerves in their intracranial portion, consecutive to a dilatation of the third ventricle, or to a parachiasmatic lesion. (12 illustrations.) Ray K. Daily.

Schlezinger, N., Alpers, B., and Weiss, B. **Suprasellar meningiomas associated with scotomatous field defects.** Arch. of Ophth., 1946, v. 35, June, pp. 624-642.

Suprasellar meningiomas are characteristically associated with atrophy of one or both optic nerves and bitemporal hemianopsia. In almost all instances the symptoms are slowly progressive, with prominent visual loss and disabling headache. Not sufficiently well recognized as part of the suprasellar tumor syndrome is the occurrence of sudden visual loss with scotomas in the visual fields, associated with headache. The development of symptoms may be so rapid as to suggest the presence of retrobulbar neuritis.

Four cases of proven suprasellar meningiomas are reported with details of the physical findings, including visual fields. They illustrate the early occurrence of scotomatous field defects. The authors believe that the syndrome of atrophy of the optic nerve with bitemporal visual field defects should be broadened to include the combination of optic nerve atrophy and expanding scotomatous field defects. In the absence of headaches and of deformities of the sella turcica, this syndrome is sufficient to warrant routinely the performance of complete examination of the spinal fluid and pneumoencephalography.

Since meningiomas are benign tumors and the suprasellar region is accessible to the neurosurgeon, an early diagnosis is desirable. (References, 9 figures.) John C. Long.

13

EYEBALL AND ORBIT

Giscard, A. **Pulsating exophthalmos in pregnancy.** Ann. d'Ocul., 1946, v. 179, no. 2, pp. 108-111.

A woman, 21 years of age, in the sixth month of pregnancy noticed a sharp head pain during defecation. Prominence of the eye was observed together with a pulsation synchronous with the pulse. There was also dilatation of the periorbital veins and bulbar conjunctival vessels. Ligation of the common carotid was refused. During the fourth month of a subsequent pregnancy intracranial pulsation became more intense. A basal hysterectomy was performed under spinal anesthesia, and a vigorous baby of seven pounds was born. Fifteen months later the ocular symptoms were unchanged.

Charles A. Bahn.

Gruyton, Jack. **Decompression of the orbit.** Surgery, 1946, v. 19, June, p. 790.

Gruyton reviews the literature on the various surgical approaches to the orbit for its decompression. He compares the advantages and disadvan-

tages of the intracranial, sinus, and lateral approaches. He describes a technique for lateral orbital decompression which is a modification of the Shugrue operation described in Spaeth's textbook. He reports five patients operated on by this technique, two of them bilateral, with a reduction of the exophthalmus of 3 to 7 mm. He feels that this operation is the safest, has least danger of postoperative infection, and avoids the postoperative pulsation which often follows. (Bibliography.) John B. Hitz.

Hanbery, J. W. **Orbital tumors.** Stanford Med. Bull., 1946, v. 4, May, pp. 52-62.

The most constant sign of intraorbital tumors is unilateral exophthalmos. In the order of frequency of occurrence the growths are: blood vessel tumors, pseudotumors, meningiomas, osteomas, neurogenic tumors, sarcomas, dermoid and epidermoid cysts, lacrimal gland tumors, and xanthomas. The temporal transconjunctival, the lateral Krönlein, and the Dandy transfrontal approach are described. Twelve cases are reported. (3 tables and six figures.)

I. E. Gaynon.

Marcks, K., and Zugsmith, G. **Plastic repair of deformities of the socket and minor defects about the orbit.** Arch. of Ophth., 1946, v. 35, July, pp. 55-69.

As a preliminary to discussion of plastic repair the authors state that there are essentially four types of sockets, depending on the method by which the eye is removed. The sockets formed by enucleation of the globe without an implant, and those formed by enucleation of the globe and implantation of a sphere, are inferior to those formed by evisceration of the global contents, removal of the cornea, closure of the sclera without an implant and coverage with conjunctiva. With the latter the motility and appearance of the prosthesis, are much better. The socket formed by evisceration of the ocular contents with an implanted sphere placed in the scleral sac, followed by closure of the sclera and conjunctiva undoubtedly gave the best results.

Associated with the alteration in function in the socket, various changes occur in the conjunctiva and the changes that occur after each type of removal are delineated. A discussion follows of the technique used in complete lining of the socket with skin, absence of conjunctiva, absence of inferior cul-de-sac, absence of cul-de-sac due to redundancy of mucous membrane, skin-mucous membrane combination, complications existing in socket repair, and atony of the lower lid.

Patients are going to be more and more critical of results, and surgery will need to be of the best. (7 illustrations.) R. W. Danielson.

Orzalesi, Francesco. **Localized metastatic scleritis with exudative detachment of the retina.** Riv. di Oftalm., 1946, v. 1, Feb., pp. 73-84.

A woman, aged 47 years, developed a phlegmon of her left orbit with tenonitis, scleritis, irtis, and almost complete retinal detachment during the course of a severe furunculosis. Vision was reduced to the ability to count fingers excentrically at 50 centimeters. Sulfathiazole and autogenous vaccine, was used for treatment which was followed by complete reattachment of the detachment in five months and a visual acuity of 10/10. (References.)

K. W. Ascher.

Taylor, W. O. G. **The nervous nasalis complex of Charlin.** Proc. Roy. Soc. Med., 1946, v. 39, March, p. 254.

A young African soldier admitted to an army hospital had suffered pain in his right eye for eight days. Blepharospasm and limbal injection were present. A preliminary diagnosis of iritis was made. Cultures, smears, and blood studies were all negative. Atropine and heat were prescribed.

Four days later beads of sweat gathered at the right side of the tip of his nose which reappeared within a few minutes after they were wiped away. Many fine postcorneal precipitates were seen on slitlamp examination.

Radiant heat therapy was of no avail. The eye became worse and the patient suffered reflex pain in the teeth and the head on the same side. Nerve block was performed by injections of 2 cc. of 3 percent novutox deep in the medial wall of the middle of the orbit. Early relief and complete cure occurred within ten days.

The author differentiates this syndrome of the nasal nerve from that of the pterygo-palatine ganglion.

F. M. Crage.

14

EYELIDS AND LACRIMAL APPARATUS

Barrenechea, S., and Contardo R. **Dacryocystorhinostomy (Arruga's technique).** Arch. Chilenos de Oft., 1945, v. 2, Nov.-Dec., pp. 14-18.

Using the technique of Arruga, the authors operated on 43 cases, with 35 completely successful, 4 incompletely successful, and 4 failures. They conclude that this operation should be performed by preference in those young individuals in whom it is desired to preserve the lacrimal drainage channels with avoidance of radical operations such as extirpation or destruction of the lacrimal sac. (2 statistical tables, 2 X-ray plates, references.)

W. H. Crisp.

Ferrié, J. **Davis' grafts in reconstructive facial surgery.** Ophthalmologica, 1945, v. 110, Nov.-Dec., pp. 292-299.

After surveying the various methods of autoplasty used in corrective face surgery, the author rejects some as unesthetic, and others as unreliable or incomplete. He favors the Davis method, for severe burns and for the correction of cicatricial ectropion of the upper eyelid. It is a simple method and gives satisfactory esthetic results. (3 photographs, references.)

F. Nelson.

McArthur, G. A. D. **Some notes on West's operation.** Med. Jour. Australia, 1946, v. 1, April 13, p. 508.

In 38 patients 42 sac operations were performed. Thirty-one patients were relieved and 35 operations were successful. Among the seven failures the eyes in two, previously constantly moist, were now almost constantly dry. The others were improved markedly.

The author feels that this operation should be performed by the rhinologist. General anaesthesia is required and where septal resection is necessary nasal packing for 24 hours is indicated. He feels that this operation is gradually supplanting sac removal except where cataract extraction is necessary. The West operation is considered the easiest in sacs with chronic infection where a good result can usually be predicted.

Francis M. Crage.

Mellick, A. **Case of secondary**

oblique facial cleft. Brit. Jour. Ophth., 1946, v. 30, April, pp. 221-224.

An unusual case of partial oblique facial cleft in a soldier is presented. The defect consisted of a bridge of skin from the site of the upper canaliculus to the plica semilunars. The lower canaliculus was normal and patent. The defect is ascribed to an adhesion or pressure from an amniotic band. (4 illustrations.) Morris Kaplan.

Pokhissoff, N. **Treatment of eversion of the lacrimal puncta.** Ann. d'Ocul., 1946, v. 179, no. 1, pp. 41-49.

After a review of numerous operations, the following method is discussed in detail. After anesthesia of the inferior lid and its conjunctival lining two sutures are placed through the entire thickness of the lid at the internal angle. The lid is supported by a Jaeger lidplate. With a scalpel the conjunctiva is dissected under the lacrimal puncta to form a triangular flap with its base up. A second triangle is made, the base of which is the prolongation of the internal side of the first triangle. The base of this triangle is about 3 mm. long and the flap is situated 2 mm. from the lid border. These flaps form two Ls which are united; the obtuse angle interiorly, the acute angle exteriorly. The second flap is excised with scissors and the margins united with four or five sutures. The first reunites the angles of the two Ls, and the other sutures unite the margins of the horizontal wound. The sutures are removed three or four days later. The dimensions of the flap can be varied.

Six illustrative cases are described. Twenty-five operations were performed by the author; five binocular and twenty monocular. All patients were observed at least ten months. (21 references.) Charles A. Bahn.

deRoetth, Andrew. **Penicillin in hordeolosis.** Northwest Med., 1946, v. 45, Sept., pp. 658-660.

Applications of penicillin in the form of ointment is advocated in recurring styes. Attention is drawn to the possibility of dermatitis following prolonged use. Applications of 2,000 units per c.c. are made for times a day for eight to fourteen days. A. G. Wilde.

Stein, S. **Treatment of chronic blepharoconjunctivitis with penicillin ointment.** Arch. of Ophth., 1946, v. 35, June, pp. 655-661.

The history, method of assay, and bacterial sensitivity of penicillin are reviewed. An ophthalmic ointment containing 100,000 Oxford units of penicillin in 7 grams of base was prepared with wool fat, petrolatum and water. This ointment, for all practical purposes, was stable at room temperature for one month.

Twenty-five patients with chronic blepharoconjunctivitis were treated with this ointment. A single daily dose containing 700 to 800 Oxford units was employed. All but two responded favorably to this treatment. The penicillin ointment has a decided advantage over drugs formerly used in the treatment of chronic blepharoconjunctivitis. There was no evidence af an allergic reaction to penicillin in the series of 25 cases. (References.) John C. Long.

Ural, Z. **Cases of Marcus Gunn phenomenon.** Oto-Nöro-Oft., 1946, v. 1, no. 2, p. 69.

Two cases of Marcus Gunn phenomenon observed in young men are reported. Both had ptosis of the left upper

lid. The author believes that this is significant. F. H. Haessler.

15
TUMORS

Barraquer, M. B. **A plexiform neuroma of the caruncle and the ciliary border.** Arch. de la Soc. Oft. Hisp.-Amer., 1945, v. 5, April, pp. 245-251.

A case of this rare tumor situated bilaterally on the caruncles, and ciliary border of the lower lids is reported. The diagnosis was made microscopically. A general examination of the 52-year-old woman revealed no other hereditary or congenital lesions. (7 illustrations.)
Ray K. Daily.

Cortez-Herman. **Plasmoma of the conjunctiva.** Arch. de la Soc. Oft. Hisp.-Amer., 1945, v. 5, April, pp. 238-244.

A mass in the lid of a 21-year-old woman was found microscopically to be a plasmoma. It was successfully destroyed by diathermy. (6 illustrations.)
Ray K. Daily.

16
INJURIES

Aiello, G. **Trinitrotoluene intoxication and ocular affections.** Ann. di Ottal. e Clin. Ocul., 1946, v. 73, Jan., pp. 17-21.

The author presents and discusses the case of a 23-year-old female munitions worker presumably suffering from trinitrotoluene poisoning, who showed numerous small punctate and flame-shaped hemorrhages along the retinal vessels, low-grade secondary papillitis, a stellate figure in the macula, and eventually a large vitreous hemorrhage. No underlying systemic disease could be found (blood pressure was normal, examination of the urine was essentially negative, and examination and tests for tuberculosis were also negative), but the possibility of the concomitant action of other toxic substances was admitted.
Harry K. Messenger.

Dufour, R. **The X-ray localization of intraocular foreign bodies.** Ophthalmologica, 1946, v. 111, April-May, pp. 310-314.

The author uses a 9-mm. metallic ring and a new graph which he superimposes on anteroposterior and profile X-ray exposures of the eye. The foreign body is exactly localized with compass and rule. Alice R. Deutsch.

Grana, P. C. **Conjunctivitis and dermatitis due to "Beach apple."** Arch. of Ophth., 1946, v. 35, April, pp. 421-422.

Thirteen casualties were observed in troops stationed in Panama from the use of a poisonous plant, Hippomane manchinella, in camouflage. Within two hours of contact with the shrub excruciating pain developed in the eyes accompanied by excessive tearing, injection of the conjunctiva, and slight chemosis. The skin of the faced showed a diffuse, patchy erythema and swelling. The use of dilute boric acid solution for the eyes and dilute sodium bicarbonate solution for the skin proved effective. The average stay in the hospital was three days, and no complications occurred.
John C. Long.

Hughes, W. F. **Alkali burns of the eye.** Arch. of Ophth., 1946, v. 35, April, pp. 423-449.

This is a detailed review of the literature and summary of the present knowledge on this subject. Alkali burns are progressive in type, and serious late

complications frequently develop after little evidence of early injury. The severity of the lesion is less dependent upon the character of the cation than on the concentration of the alkali, the pH of the solution, and the duration of the exposure. In contrast to acid burns, the mucoid content of the cornea decreases.

Treatment effective for mild and moderately severe alkali burns consists of immediate irrigation with copious amounts of water or any bland solution, a thorough search and removal of any residual particles of alkali hidden within the conjunctival cul-de-sacs, followed by instillations of buffer solution (pH 4.5), instillation of mydriatics, use of 10 percent neutral ammonium tartrate (or lactate) after lime burns, instillations of sulfonamide or penicillin ointments to prevent secondary infection, and prevention of symblepharon. Early and repeated corneal paracentesis resulted in exceptionally good results in some reported cases. The early excision of necrotic conjunctival and episcleral tissue and its replacement with mucous membrane or conjunctival grafts has been employed in severe burns. Analysis of these reported cases does not reveal any striking benefit attributable to such a procedure. John C. Long.

Kutscher, C. F. **Ocular effects of radiant energy.** Indus. Med., 1946, v. 15, May, p. 311.

After a preliminary discussion of the nature of radiant energy, its absorption by the tissues of the eye is discussed.

Infrared radiations longer than 30,000 Angstrom units are completely absorbed by the cornea; below this level corneal transmission increases slowly, and at 11,000 A.U., 96 percent of the radiation is transmitted. The lens absorbs infrared between 18,000 and 10,000 A.U. The iris absorbs all infrared, translating this energy into heat which is dissipated either by the iris vessels, or by raising the temperature of the aqueous. Very little infrared radiation reaches the retina, and a thermal burn on this basis is very unusual.

All visible light (7,800 to 3,900 A.U.) is transmitted to the retina, where an excessive dose may produce a thermal burn. Ultraviolet light is absorbed by the lens, beginning at 3,800 A.U. Radiation the wavelength of which is 3,200 A.U. is completely absorbed. Below this level the cornea absorbs ultraviolet.

Only those radiations which are absorbed will product biologic effects in tissues. Ultraviolet rays cause abiotic, or destructive effects after a latent period of some hours; infrared produces immediate thermal injury.

Corneal burns from infrared rays are uncommon, but show prompt diffuse opacification. More common is the so-called "glass-blowers" cataract, that appears in the posterior axial part of the lens after prolonged exposure to infrared (many years). Ultraviolet more frequently causes painful corneal injury, followed by fairly rapid recovery without residual damage.

Gamma rays produce cataract after several years' interval. Lens opacities have been observed after exposure to lighting or electric currents.

Treatment of these radiant energy injuries is discussed briefly.

Benjamin Milder.

Somerville-Large, L. B. **An operation for posterior route extraction of intraocular foreign bodies.** Brit. Jour.

Ophth., 1946, v. 30, April, pp. 208-213.

A method for the extraction of magnetic foreign bodies through the posterior route is described. Its essential characteristic lies in the use of a 1.5 mm. trephine opening through the sclera nearest the foreign body. The disc is dissected from the choroid which is punctured by diathermy or actual cautery. A point of the giant magnet is inserted. The conjunctiva is sutured over the trephine hole. No vitreous leakage or other complications occurred. The operation was carried out 24 times. (3 illustrations.)

Morris Kaplan.

Hertzberg, R. **Quinine amaurosis, report of case.** Med. Jour. Australia, 1946, v. 2, July 20, pp. 92-93.

The patient noted that after taking 50 grains of quinine sulfate, his vision became blurred and on the third day he was unable to see at all. Atabrine was substituted for quinine and the following day, vision began to return. The pupils were dilated and immobile, there was edema of the macula in each eye, and the fields were normal. Two days later the discs became pale and the arteries attenuated. After two weeks visual acuity was 6/6 and the pupillary reactions normal, although the vessels were still attenuated and the discs pale.

I. E. Gaynon.

17

SYSTEMIC DISEASES AND PARASITES

Argañaraz, Raul. **Ocular manifestations of "sacred disease."** Arch. de Oft. de Buenos Aires, 1943, v. 18, Nov., p. 546.

The author studied the ocular findings in seven cases of epilepsy. Most of the patients presented clinical evidence of other neurologic lesions. The ocular findings consisted of enlargement of the blind spot, which was invariably found, constriction of the visual fields, congestion of the papilla, and optic neuritis or atrophy. The author points out that textbooks of ophthalmology fail to record ocular findings of significance in epilepsy and stresses the importance of the ophthalmologic examinations in the diagnosis of this disease. (Visual field charts.)

Plinio Montalván.

Barriere, L. A. **Orbital miasis.** Arch. de Oft. de Buenos Aires, 1943, v. 18, Nov., p. 585.

A case of orbital miasis in a 70-year-old man is reported. The lesion consisted of an extensive ulcerative process involving the lower lid and soft tissues of the cheek and penetrating deep into the orbital cavity. The globe was destroyed by panophthalmitis. After the removal of the larvae the lesions healed quickly leaving considerable granulation tissue. The life cycle of the larva and the mechanism of infestation are briefly discussed. (Illustrations and bibliography.) Plinio Montalván.

Cullom, M. M. **Role of sinusitis in eye pathology.** Laryngoscope, 1946, v. 56, April, p. 164-179.

The author presents detailed case histories of 16 patients, each of whom showed unequivocal improvement of the ocular disease following radical sinus surgery. In each instance the sinusitis was sufficiently pronounced that it constituted a justifiable indication for surgical intervention. The eye diseases which improved included six ulcerations of the cornea, two retinochoroiditis, and four which were diagnosed as toxic amblyopia.

Benjamin Milder.

Knapp, Paul. **Alopecia of one eyebrow.** Ophthalmologica, 1946, v. 3, Feb.-March, p. 67.

A girl, 27 years of age, lost practically all the hairs of the left eyebrow after severe recurrent attacks of a neuralgia in the left side of her forehead. A normal condition was only restored after more than a year. A trophic disturbance, probably caused by an affection of the left ethmoid, might have been the reason for this unusual occurence. Alice R. Deutsch.

Pacheco-Luna, R. **Notes on oncocerciasis in Guatemala.** Brit. Jour Ophth., 1946, v. 30, April, pp. 234-237.

A brief review of the picture of oncocerciasis is given. It is very common in Guatemala where it is estimated that 20,000 people are infected. Ocular manifestations are present in 30 percent and 2 percent are blind. The adult filaria are found in subcutaneous nodules about head and eyes. The microfilaria migrate from these tumors in the lymph channels. They are very easily seen in the corneal stroma, conjunctiva, and vitreous, and swim actively in the aqueous. The most distressing early symptom is photophobia which is followed by a punctate keratitis. Gradual sclerosis and atrophy follow. These signs and symptoms may persists for many years. The author observed one for 25 years. There is no treatment although extirpation of the subcutaneous tumors retards the spread of the disease.

Morris Kaplan.

Puig Solanes, Magin. **Present condition of the clinical ocular problem of onchocercosis.** Reprint from Rev. Méd. del Hosp. Gen., 1946, v. 8, Feb., pp. 339-414.

The paper was presented to the Pan-American Congress of Ophthalmology at Montevideo in November, 1945. To some extent it repeats the material contained in the paper entitled "Onchocercosis in the State of Chiapas" (see below), utilizing 11 illustrations and over two pages of references, mostly Ibero-American. W. H. Crisp.

Puig Solanes, M., Fontes, A., and Quiroz, J. A. **Onchocercosis in the State of Chiapas.** Reprint from Rev. Salubridad y Asistencia (Mexico), 1945, July-Aug., pp. 69-96.

This paper summarizes the results of a clinical investigation in the onchocercosis zone of the State of Chiapas. A number of statistical details are given, together with 19 black and white photographic illustrations. The work is completed by a large and comprehensive statistical table. W. H. Crisp.

Sala, G. **Hepatolenticular degeneration (Wilson's disease) and ocular signs.** Riv. di Oftalm., 1946, v. 1, Feb., pp. 124-139.

A girl 13 years of age, with typical Wilson's disease, had bilateral Kayser-Fleischer corneal rings and very faint opacities in anterior polar region of the lenses. The latter were yellowish, and under the corneal microscope minute radial extensions of the same color were seen. The opacities were immediately beneath the lens capsule. Whereas Kayser and Fleischer described the corneal rings connected with "pseudosclerosis" in 1902 and 1903 respectively, the first case of Kayser-Fleischer's corneal ring associated with sunflower cataract was reported by Siemerling and Oloff, in 1922. The lens opacities, that are noted in patients with Wilson's disease, are very similar to those en-

countered in eyes with chalcosis. The diagnostic importance of both the Kayser-Fleischer ring and the sunflower-like lens opacity for the recognition of Wilson's disease is stressed, and the opinions as to the chemical constitution of theses opacities are discussed. (References.)

K. W. Ascher.

Schmid, A. E. **Dysmorpho-dystrophia mesodermalis congenita.** Ophthalmologica, 1946, v. 111, Jan., pp. 28-60.

The author reports his investigation of a patient with this hereditary anomaly, her family tree, and a thorough analysis of the theoretical implications in the light of discussions of the subject in the literature. The patient, a girl, 17 years of age, had strikingly short fingers, hands, toes, and feet. In early childhood she had bilateral inguinal hernia, vaginal prolapse, scoliosis, and defective mobility of her joints. In each eye the lens was small, spherical, and ectopic. In the right eye it was luxated into the anterior chamber and in the left eye into the vitreous. In each eye there was atrophy of the iris with synechia and an anomaly of the optic disc. The patient is compared with a classmate who had arachnodactyly. Both conditions are inherited according to the same pattern and differ only in the length and width of body and extremities. Incomplete forms of both anomalies are more common than the fully developed symptom complex. The author suggests that the Marfan type be called dolichomorphy and the Marchesani type brachymorphy. Etiologically the condition is assumed to be a mesodermal dystrophy. (6 photographs, 7 drawings, 1 family tree, references.)

F. Nelson.

Tinelli, Giuseppe. **The syndrome of Laurence-Moon-Bardet-Biedl.** Boll. d'Ocul., 1944, v. 23, Oct.-Dec., pp. 257-280.

A young man, 18 years of age, is described who had adiposo-genital dystrophy, esodactily of the feet, mental deficiency, hemeralopia, greatly reduced vision, convergent strabismus, vertical nystagmus, retinitis pigmentosa without pigment, and secondary optic atrophy. Metabolic investigations revealed that the diencephalic-hypophyseal system was affected. He was a son of consanguineous parents and one of his two brothers was mentally deficient. All similar cases reported in the literature are chronologically tabulated. The most important pathogenetic theories in this field are discussed. (Bibliography.)

Melchiore Lombardo.

18

HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Blake, E. M. **Prevention of blindness.** Conn. State Med. Jour., 1946, v. 10, May, Pp. 379-382.

The prevention of blindness is not a problem for the ophthalmologist only, but for the medical profession as a whole.

The incidence of ophthalmia neonatorum should be reduced to almost zero by modern preventive measures, plus chemotherapy and antibiotics.

With premarital blood tests and treatment with penicillin, blindness in childhood from syphilis should almost never occur.

During childhood and throughout adolescence the principal cause of blindness is accident. Accidents can only be prevented by education of

parents and children, and the continuous reiteration of "don'ts" with explanations of the reason for the "don'ts."

The greatest loss of vision, while not leading to blindness, but to great reduction in sight is in strabismus. Early ophthalmologic examination of all children, and treatment for strabismus where necessary is indicated.

Chronic simple glaucoma is the most important single cause of loss of sight today. The ophthalmologist should take the tension of the eye with a tonometer in all patients over 45 years of age.

There is not much hope of prevention of cataract as it is one of the manifestations of tissue senility.

In industrial medicine preëmployment ophthalmologic examination is of importance both to employer and employee. The wearing of protective glasses in industry where the need is indicated, reduces the risk of accidents.

Theodore M. Shapira.

Galton, E. M. G. **Ocular decompensation.** Brit. Jour. Ophth., 1946, v. 30, April, pp. 232-234.

The author compares ocular symptomatology with cardiac and finds them closely similar. In examining huge numbers of men in the armed services, it was seen that eyes which had previously given no difficulty suddenly caused much discomfort. Since the eyes had not changed anatomically, it was concluded that the neuromuscular system could no longer cope with the new mental and physical load and therefore became decompensated. Sometimes the mere prescribing of lenses aided, but most often the patient had to be treated as a complete medical entity. A plea is made for a continuation of this broad approach to ophthalmic problems.

Morris Kaplan.

Pereira Gomes. **Study of the vision of drivers of vehicles.** Reprint of paper presented before the fifth Congresso Brasileiro de Oftalmologia, 1946, June, 18 pp.

The author presents a partial review of the history of the subject, particularly as concerns the national traffic code in Brazil. The influence of monocular vision is considered as well as details relating to the light sense, dark adaptation, dazzling, hemeralopia, visual field, and tubular vision. Color sense is also discussed. The author concludes by making certain recommendations for amendment of the traffic code in Brazil, in relation to the vision of candidates for appointment in the capacity referred to. (References.)

W. H. Crisp.

Scalinci, Noè. **The Italian contribution to the earliest knowledge of the structure and function of the retina.** Ann. di Ottal. e Clin. Ocul., 1946, v. 73, Jan., pp. 58-59.

Fontana was the first to recognize fibers and cells in the retina, and, what is more important, to perceive that these elements are identical with those of cerebral nervous tissue. It was therefore not Langenbeck (1836) who first noted this identity, but Fontana about sixty years earlier. To Pacini (1845) belongs the priority for giving an approximately exact description of the minute structure of the retina. Golgi's chrome-silver technique of staining (1872-75) led to a more precise knowledge of the finer interrelations of the various layers, and to Tartuferi (1888) belongs the credit for introducing the new era in retinal histology.

The work of other Italians who also pioneered in this field receives brief mention.

Harry K. Messenger.

Tisher, P. W. **Opportunity for prevention of blindness in industry.** Connecticut, M. J. 1946 v. 10, May, p. 382-383.

The losses in production and the human misery which result from industrial eye accidents, of which 90 percent are preventable, may be lessened by pursuing, for each factory, a blindness-preventing program which includes these features: enforced protective glasses; protective shields on machines; proper lighting; cleanliness; eye examinations; and job analysis.

Such a program will result in benefits to the manufacturers, as well as to the workers. Benjamin Milder.

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ANATOMY, EMBRYOLOGY, AND COMPARATIVE OPHTHALMOLOGY

Alexander, G. F. **The elastic tissue within the eye.** Trans. Ophth. Soc. U. Kingdom, 1944, v. 64, pp. 195-198.

The author states that Descemet's membrane splits into a number of sheets or lamellae which are inserted into the tip of the scleral spur. These lamellae with subjacent corneal lamellae constitute the pectinate ligament. They are non-distensible. The contraction of the radial fibres of the ciliary muscle pulls the choroid forward. The arrangement of the opening of the pectinate ligament produces a valve-like action, allowing the aqueous to percolate into the canal of Schlemm, but preventing any flow of blood into the anterior chamber during venous congestion.

He describes experiments which indicate that there is a definite hyaline membrane of the vitreous and that it is split into two layers. The anterior extends into the zonule of Zinn and the posterior forms the patellar layer. Between these two layers the canal of Petit is filled with aqueous.

Beulah Cushman.

Minton, J. **Ophthalmic experiences in the east.** Trans. Ophth. Soc. U. Kingdom, 1944, v. 64, pp. 199-209.

The author describes epidemic ophthalmias as seen in Iraq, Egypt, Palestine, India and Ceylon. The carriers of infection such as flies, dust, and sand and the lowered resistance of the children during the summer months seem to be factors in the development of the epidemics. Trachoma was prevalent and usually followed the epidemic ophthalmias. Syphilis was extremely common but interstitial keratitis was rarely seen. Cataract and glaucoma were found no oftener than in Europe but occurred at an earlier age.

The British troops had few infections, the Indian troops showed a much greater morbidity. The quiescent trachoma so frequently present in the Indian troops might account for some of the infections.

Sulfanilamide ointment was of great value in the treatment of trachoma and in the different types of conjunctivitis.

Beulah Cushman.

Offret, G. **A review of modern studies concerning the physiology and psychophysiology of the parietal and occipital lobes of the brain.** Arch. d'Opht., 1946, v. 6, no. 2, pp. 145-172.

In this long article Offret gives a comprehensive review of the anatomy and functions of the parietal and occipital lobes. The many ophthalmologic aspects of the subject considered include anomalies of spatial orientation, reading, writing, color vision, and stereoscopic vision. Discussion of these subjects is preceded by a summary of

modern anatomical knowledge in which numerous references to current literature are made although the author has not provided a bibliography. This valuable article does not lend itself to review but should be read in its entirety.

Phillips Thygeson.

Swan, Charles, and Tostevin, A. L. **Congenital abnormalities in infants during pregnancy, with special reference to rubella.** Med. Jour. Australia, 1946, v. 1, May 11, pp. 645-659.

All important data are presented in tabular form and an analysis is presented in the text. In this investigation 56 infants and two fetuses were examined; 46 of them were found to have congenital malformations. In 40 instances, the mothers had rubella; 36 of the infants had congenital defects which with few exceptions were more or less complete reproductions of the syndrome that consists of cataract, deafmutism, heart disease, and microcephaly. In two instances in which rubella was contracted less than two weeks before conception, the infants were normal. In the remaining 16 instances the mothers were ill during pregnancy with morbilli, mumps, varicella, herpes zoster, and scarlatina, and nine of the infants were abnormal.

The development of defects is elucidated on the basis of Stockards experimental studies of eggs of the minnow. The type of abnormality is determined by the particular developmental moment at which the noxa acts. Fetal tissues are susceptible to injury by virus infections and those Anlagen which are in a stage of rapid growth are most vulnerable. It has been stated that if maternal infection occurs in the first six weeks of pregnancy, fetal injury will be widespread. After eight weeks the eyes, heart, and semicircular canals may escape, but the cochlea is still vulnerable. After the third month damage to the fetus is rare. In the light of the data presented by Swan and Tostevin, this view must be modified. There must be other factors at work in determining whether a particular primordium is affected even if it is rapidly proliferating, and has developmental "precedence" over the other centers of growth.

I. C. Gaynon.

NEWS ITEMS

Edited by DONALD J. LYLE, M.D.
904 Carew Tower, Cincinnati 2
News items should reach the editor by the 12th of the month

DEATHS

Dr. George Franklin Libby, Fillmore, California, died September 13, 1946, aged 78 years.

Dr. Claude Worth McKee, Greensburg, Pennsylvania, died September 11, 1946, aged 70 years.

Dr. Edward Brent Mitchell, Lawton, Oklahoma, died August 13, 1946, aged 78 years.

Dr. Harold Vincent Phelan, Cleveland, Ohio, died September 1, 1946, aged 51 years.

Dr. Edward Francis Ritter, Jr., Chicago, Illinois, killed in action in the Asiatic area, October 24, 1944, aged 35 years.

Dr. Theodore Lasater Terry, Boston, Massachusetts, died September 28, 1946, aged 47 years.

MISCELLANEOUS

HEED OPHTHALMIC FOUNDATION

The Heed Ophthalmic Foundation is now offering a limited number of fellowships for advanced training in ophthalmology. Only those who have completed a minimum of two years' specialized study in ophthalmology are eligible. United States citizenship is required.

For further details, refer to an editorial appearing on page 79 of this Journal and in the current *Transactions of the American Academy of Ophthalmology and Otolaryngology.*

Application blanks and additional information may be obtained from the Secretary of the Board of Directors, Dr. M. Hayward Post, 520 Metropolitan Building, 508 North Grand Boulevard, St. Louis 3, Missouri.

FRANCIS I. PROCTOR LABORATORY

The Division of Ophthalmology of the University of California announces the establishment of the Francis I. Proctor Laboratory for Ophthalmic Research. A sum of over $500,000 from the estate of Dr. Proctor was set aside and given by Mrs. Proctor for this purpose. In addition, as previously announced, Mrs. Proctor has donated a sum of $20,000 for the establishment of the yearly Francis I. Proctor Lecture on Ophthalmology to be given at the University of California.

Mrs. Berthold Guggenheim has guaranteed a sum of $65,000 for the construction of a laboratory of 3,000 square feet in the new science building which is to be constructed on the medical school campus as soon as building again becomes feasible. In the interim the laboratory is being housed in temporary quarters.

Dr. Michael Hogan has been appointed director of the Proctor Laboratory.

The plans call for research in the various branches of ophthalmology as soon as facilities are available. In the development of the laboratory, the director and the staff will be aided by the advice and experience of Dr. Phillips Thygeson, who is now a member of the visiting staff.

EYE BANK APPOINTMENTS

The Board of Directors of The Eye Bank for Sight Restoration, Inc., announces the following scholarship and fellowship awards and appointments:

Dr. Herbert M. Katzin, New York, has been put in charge of the Laboratory for Ophthalmic Research of The Eye Bank for Sight Restoration, Inc.

Dr. Frank Constantine has been granted a Fellowship to pursue studies in relation to corneal vascularization.

Dr. Arnold Forest of the Army Institute of Pathology, Washington, D.C., has been granted a Fellowship for training in Ophthalmic Pathology with special emphasis on corneal pathology.

Dr. Milo H. Fritz of New York has been granted a Fellowship to continue studies in vitreous replacement and vitreous transplants.

RESEARCH PROGRAM OF COMMITTEE ON VETERANS' MEDICAL PROBLEMS

At a conference suggested by the Surgeon General, U. S. Army, and attended by representatives of the Chief Medical Director, Veterans Administration, and of the Surgeons General of the U. S. Army, Navy, and Public Health Service, the National Research Council was asked to explore the value and feasibility of a long-term program of follow-up study and clinical research. The report of this investigation was approved by the above agencies and at the request of the Chief Medical Director, Veterans Administration, the National Research Council has appointed a Committee on Veterans' Medical Problems.

The purpose of the Committee is to plan and carry out a medical research program utilizing the wealth of material accumulated during World War II so that the care of patients, the investigation of disease, and the improvement of medical practice and education may be advanced. Medical records of service personnel will be available to accredited representatives of the National Research Council when working on studies approved by the Army, Navy, or Veterans Administration.

The program, dealing with medical problems of veterans and of the armed forces, will include projects of three types: (1) clinical follow-up studies; (2) original investigations which may be carried out in Veterans Administration hospitals or other institutions; and (3) statistical studies on mortality and duration of disability.

The Committee will consider proposals for studies originating from the Veterans Administration, the U. S. Army, Navy, Public Health Service, National Research Council, universities, or other workers. Proposals will be referred to advisory committees of the National Research Council for detailed analysis, after which they will be evaluated by the Committee on Veterans' Medical Problems. Carefully established criteria will be followed, emphasis being placed upon significant long-term research or shorter problems which fit well into the Committee's overall program. The present program is financed by contract with the Veterans Administration. It is hoped that funds will be available for grants in the spring of 1947.

The Committee will attempt to evaluate and assist medical studies of direct or collateral importance to veterans. At the request of the Veterans Administration, it will analyze all proposals for medical research submitted to that agency, whether or not financial support under the Committee's program is needed. In the case of medical officers of the Veterans Administration, Army, or Navy, application forms may be obtained and returned through the appropriate channels. Other agencies or individuals may obtain the forms from, and submit them directly to the Committee on Veterans' Medical Problems, Division of Medical Sciences, National Research Council, 2101 Constitution Avenue, Washington 25, D.C.

After approval of a project, the Committee Office at the above address will offer, when requested, such special services as it is able to render. These will include facilities for statistical planning, aid in securing medical records and preparing rosters, assistance in locating veterans for follow-up studies, and help in analysis of the results obtained.

(Editor's Note. Ophthalmic ex-medical officers have in many instances kept careful records of the patients whom they saw during their military service, and the above plan offers these ex-medical officers an opportunity to carry out what may well be exceedingly valuable clinical follow-up studies on these patients. You are urged to write to Dr. John C. Ransmeier, Medical Executive, Division of Medical Sciences, National Research Council, 2101 Constitution Avenue, Washington 25, D.C., and send him your lists containing the names of individuals who passed through your hands and the kind of diseases or injuries involved.)

Glaucoma prize offered

The National Society for the Prevention of Blindness announces that papers submitted for the glaucoma prize of $500 offered in 1944 did not conform to the criteria set up by the ophthalmic committee selected to award the prize. Therefore, the prize is again offered for the most valuable original paper adding to existing knowledge about the diagnosis of early glaucoma or to the medical treatment of noncongestive glaucoma. The criteria may be obtained by writing to the National Society for the Prevention of Blindness, 1790 Broadway, New York 19, New York.

Papers may be presented by any practicing ophthalmologist of the Western Hemisphere and may be written in English, French, German, Italian, Spanish, or Portuguese. Those written in any of the last four languages should be accompanied by a summary in English. Closing date for receipt of papers is December, 1947.

The award will be made by the Society with the guidance of an ophthalmic committee composed of Drs. John N. Evans, chairman; Frank C. Keil, Daniel B. Kirby, John M. McLean, R. Townley Paton, Algernon B. Reese, Bernard Samuels, Kaufman Schlivek, Willis S. Knighton, Manuel Uribe Troncoso, and David H. Webster.

Societies

On November 19, 1946, the New England Ophthalmological Society participated in the program of the annual meeting of the Massachusetts Eye and Ear Alumni Association. The program included: Morning Session—Surgical Clinic conducted by the Eye Staff of the hospital; Afternoon Session—Prof. W. J. B. Riddell, Glasgow, Scotland, delivered the Howe Lecture. His subject was, "Heredity and Variation in Clinical Ophthalmology."

At the evening session—the 372nd regular meeting of the New England Society—Dr. Howard F. Hill presided. Elek J. Ludvigh, Ph.D., of the Howe Laboratory of Ophthalmology, presented a paper on "Visual Acuity Tested with Moving Objects." Prof. W. J. B. Riddell spoke on "Ophthalmological Education."

The second day's meeting opened with a Surgical Clinic. Dr. Frederick H. Verhoeff presided at the afternoon session. The program included:

"Di-isopropyl Fluorophosphate in Glaucoma." Edwin B. Dunphy, M.D.

"Aniseikonia." John P. MacNie, M.D.

"Conjugate Deviation of the Eyes on Forced Closure of the Lids. Its Neurologic Significance." David G. Cogan, M.D.

"Nutritional Retrobulbar Neuritis." Frank D. Carroll, M.D.

"Spectral Absorption Measurements of the

Refractive Media of the Eye." V. Everett Kinsey, Ph.D.

"Ocular Injury Due to Sulphur Dioxide." W. Morton Grant, M.D.

"Congenital Cataracts." Francis J. West, M.D.

At the November dinner meeting of the Cleveland Ophthalmological Club, Dr. Paul A. Chandler, assistant professor of ophthalmology in the School of Medicine of Harvard University, Boston, gave a most instructive and interesting paper on "Neglected Cause of Secondary Glaucoma in Which the Lens Is Absent Or Dislocated."

The annual meeting of the Ophthalmological Society of Egypt will take place at the Memorial Ophthalmic Laboratory, Giza, Egypt, on Friday and Saturday, March 14 and 15, 1947.

The following ophthalmic papers were presented before the Section on Ophthalmology and Otolaryngology of the Southern Medical Association in Miami, Florida, on November 6, 1946:

"Causes of Failure in Glaucoma Operations." Brittain Payne, M.D., New York (by invitation).

"Separation of the Retina—Technic and Results." W. R. Buffington, M.D., Louisiana.

"A New Syndrome: Vertical Phorias with Endocrine Dysfunction." E. H. Coachman, M.D., Oklahoma.

"Migraine as Seen by the Ophthalmologist." F. A. Holden, M.D., Maryland.

"Exophthalmos in Relation to Orbital Tumors. Report of Six Cases." S. B. Forbes, M.D., Florida.

The first meeting of the Washington, D.C., Ophthalmological Society for the 1946-1947 season was held November 4, 1946, and was a joint session with the Baltimore Ophthalmological Society. Dr. Richard W. Wilkinson, president of the society, presided during the meeting.

Case presentations were made by Dr. Edward J. Cummings on "Cataracta Neurodermatica," and "Vitreous Cyst." Dr. Jules B. Chapman presented a case on "Cataracta Complicata."

The guest speaker of the evening was Prof. W. J. B. Riddell of the University of Glasgow, Scotland. His presentation was on the "Clinical Valuation of Cataract Operation." Discussion on this interesting paper was made by Dr. Clyde A. Clapp of Baltimore and Dr. John W. Burke of Washington.

The next meeting of the society is scheduled for January 6, 1947.

The next meeting of the Pennsylvania Academy of Ophthalmology and Otolaryngology will be April 26 and 27, 1947, at the Penn-Harris Hotel, Harrisburg.

The Central Illinois Society of Ophthalmology and Otolaryngology held its sixth meeting at the Hotel Pere Marquette, Peoria, Illinois, on November 30 and December 1, 1946. The following ophthalmic papers were presented at the meeting:

"Partial Tendon Transplantation of Eye Muscles for Incurable Paralysis," Harry W. Woodruff, M.D., Joliet.

"Differential Diagnosis of Ocular Proptosis," Derrick Vail, M.D., Chicago (by invitation).

"Errors in Cataract Surgery," Watson Gailey, M.D., Bloomington.

"Surgical Management of Glaucoma and Glaucoma Problems," Derrick Vail, M.D., Chicago.

Guest speaker at the meeting was the Hon. Dwight H. Green, Governor of the State of Illinois. New officers elected for the year, 1947, include: President, Walter Stevenson, M.D., Quincy; president-elect, Clarence E. McClelland, M.D., Decatur; vice-president, Clifton S. Turner, M.D., Peoria; secretary-treasurer, William F. Hubble, M.D., Decatur.

Personals

Dr. Phillips Thygeson, who since his discharge from the Army has located in San Jose, California, is now on the visiting staff of the University of California Medical School in San Francisco. Dr. Thygeson spends two days a week at the university carrying on his research work under funds from the Charles Taylor Reeves and Mrs. E. S. Heller donations. He has also been appointed to the staff of the Hooper Research Foundation.

Dr. John L. Scales, of Shreveport, Louisiana, announces his retirement after 50 years of active practice. At a reception in the Woman's Club on Sunday, November 3, 1946, some 500 guests, most of whom were physicians and their wives, paid their respects. Others present were members of the official boards of the various civic organizations of which Dr. Scales is a member, including the official board of Centenary College, and close friends.

Outstanding among those of the eye, ear, nose, and throat profession, Dr. Scales has endeared himself to an unusually large clientele, and because of his reputation for fair dealing, to all of his colleagues. Few physicians have been of such inestimable value to their communities, and news of his retirement comes with sincere regret.

Dr. William B. Clark, head of the department of ophthalmology, Tulane University of Louisiana School of Medicine, returned to Guatemala on November 7, 1946, where he concluded the research project on onchocerciasis that he began there last year.

AN INVITATION TO OPHTHALMOLOGISTS

The aim of the Guild of Prescription Opticians is to advance the science of ophthalmic optics through the development of a country-wide dispensing optical service which comprehensively meets the needs of the Eye Physicians and their patients and truly renders the most efficient form of services in eye care. The continued growth of this Guild is evidence of the success with which these unrelenting efforts have been accorded recognition.

Ophthalmology has evidenced its recognition of the important part Guild service has played in eye care because many of its members have joined at the suggestion and on the request of eye physicians.

The Guild extends to eye physicians an invitation to recommend dispensing opticians in their community who, in their opinion, conform to Guild principles. Full requirements for membership will be furnished upon request.

MEMBERSHIP COMMITTEE

Guild of Prescription Opticians of America

1218 CHESTNUT STREET, PHILA. 7, PENNA.

Guild of Prescription Opticians of America, 1218 Chestnut Street, Philadelphia 7, Penna.

Name of suggested member.....

Address.....

City..... *State*.....

(signed)..... *M.D.*